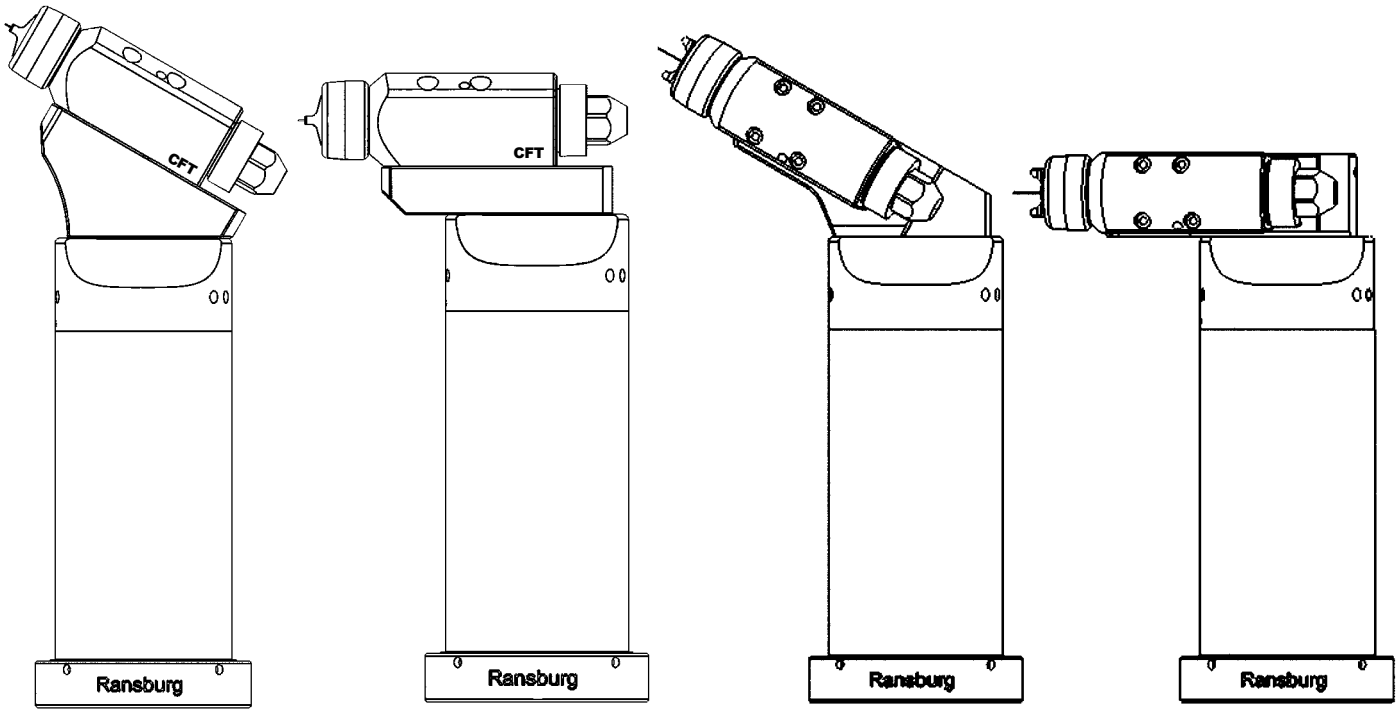
Ransburg Evolver 500 Series Dual Purge Solventborne Robotic Atomizers



FM APPROVED

Model: A13758-XXXXXX

IMPORTANT: Before using this equipment, carefully read SAFETY PRECAUTIONS and all instructions in this manual. Keep this Service Manual for future reference.

NOTE: This manual has been changed from revision **AA-14-02-R5** to revision **AA-14-02-R6**. Reasons for this change are noted under “Manual Change Summary” inside the back cover of this manual.

CONTENTS

(***Continued On Next Page***)

CONTENTS (Cont.)

SAFETY

SAFETY PRECAUTIONS

Before operating, maintaining or servicing any Ransburg electrostatic coating system, read and understand all of the technical and safety literature for your Ransburg products. This manual contains information that is important for you to know and understand. This information relates to **USER SAFETY** and **PREVENTING EQUIPMENT PROBLEMS**. To help you recognize this information, we use the following symbols. Please pay particular attention to these sections.

⚠ WARNING

A WARNING! states information to alert you to a situation that might cause serious injury if instructions are not followed.

⚠ CAUTION

A CAUTION! states information that tells how to prevent damage to equipment or how to avoid a situation that might cause minor injury.

NOTE

A NOTE is information relevant to the procedure in progress.

While this manual lists standard specifications and service procedures, some minor deviations may be found between this literature and your equipment. Differences in local codes and plant requirements, material delivery requirements, etc., make such variations inevitable. Compare this manual with your system installation drawings and appropriate Ransburg equipment manuals to reconcile such differences.

Careful study and continued use of this manual will provide a better understanding of the equipment and process, resulting in more efficient operation, longer trouble-free service and faster, easier troubleshooting. If you do not have the manuals and safety literature for your Ransburg system, contact your local Ransburg representative or Ransburg.

⚠ WARNING

➤ The user **MUST** read and be familiar with the Safety Section in this manual and the Ransburg safety literature therein identified.

➤ This equipment is intended to be used by trained personnel **ONLY**.

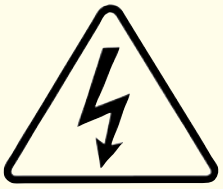
➤ This manual **MUST** be read and thoroughly understood by **ALL** personnel who operate, clean or maintain this equipment! Special care should be taken to ensure that the **WARNINGS** and safety requirements for operating and servicing the equipment are followed. The user should be aware of and adhere to **ALL** local building and fire codes and ordinances as well as **NFPA-33 AND EN 50176 SAFETY STANDARDS, LATEST EDITION**, or applicable country safety standards, prior to installing, operating, and/or servicing this equipment.

⚠ WARNING

➤ The hazards shown on the following pages may occur during the normal use of this equipment.

AREA Tells where hazards may occur.	HAZARD Tells what the hazard is.	SAFEGUARDS Tells how to avoid the hazard.
Spray Area 	**Fire Hazard** Improper or inadequate operation and maintenance procedures will cause a fire hazard. Protection against inadvertent arcing that is capable of causing fire or explosion is lost if any safety interlocks are disabled during operation. Frequent Power Supply or Controller shutdown indicates a problem in the system requiring correction.	Fire extinguishing equipment must be present in the spray area and tested periodically. Spray areas must be kept clean to prevent the accumulation of combustible residues. Smoking must never be allowed in the spray area. The high voltage supplied to the atomizer must be turned off prior to cleaning, flushing or maintenance. Spray booth ventilation must be kept at the rates required by NFPA-33, OSHA, country, and local codes. In addition, ventilation must be maintained during cleaning operations using flammable or combustible solvents. Electrostatic arcing must be prevented. Safe sparking distance must be maintained between the parts being coated and the applicator. A distance of 1 inch for every 10KV of output voltage is required at all times. Test only in areas free of combustible material. Testing may require high voltage to be on, but only as instructed. Non-factory replacement parts or unauthorized equipment modifications may cause fire or injury. If used, the key switch bypass is intended for use only during setup operations. Production should never be done with safety interlocks disabled. The paint process and equipment should be set up and operated in accordance with NFPA-33, NEC, OSHA, local, country, and European Health and Safety Norms.

AREA Tells where hazards may occur.	HAZARD Tells what the hazard is.	SAFEGUARDS Tells how to avoid the hazard.
Spray Area 	**Explosion Hazard** Improper or inadequate operation and maintenance procedures will cause a fire hazard. Protection against inadvertent arcing that is capable of causing fire or explosion is lost if any safety interlocks are disabled during operation. Frequent Power Supply or Controller shutdown indicates a problem in the system requiring correction.	Electrostatic arcing must be prevented. Safe sparking distance must be maintained between the parts being coated and the applicator. A distance of 1 inch for every 10KV of output voltage is required at all times. Unless specifically approved for use in hazardous locations, all electrical equipment must be located **outside** Class I or II, Division 1 or 2 hazardous areas, in accordance with NFPA-33. Test only in areas free of flammable or combustible materials. The current overload sensitivity (if equipped) MUST be set as described in the corresponding section of the equipment manual. Protection against inadvertent arcing that is capable of causing fire or explosion is lost if the current overload sensitivity is not properly set. Frequent power supply shutdown indicates a problem in the system which requires correction. Always turn the control panel power off prior to flushing, cleaning, or working on spray system equipment. Before turning high voltage on, make sure no objects are within the safe sparking distance. Ensure that the control panel is interlocked with the ventilation system and conveyor in accordance with NFPA-33, EN 50176. Have fire extinguishing equipment readily available and tested periodically.
General Use and Maintenance 	Improper operation or maintenance may create a hazard. Personnel must be properly trained in the use of this equipment.	Personnel must be given training in accordance with the requirements of NFPA-33, EN 60079-0. Instructions and safety precautions must be read and understood prior to using this equipment. Comply with appropriate local, state, and national codes governing ventilation, fire protection, operation maintenance, and housekeeping. Reference OSHA, NFPA-33, EN Norms and your insurance company requirements.

AREA Tells where hazards may occur.	HAZARD Tells what the hazard is.	SAFEGUARDS Tells how to avoid the hazard.
Spray Area / High Voltage Equipment 	**Electrical Discharge** There is a high voltage device that can induce an electrical charge on ungrounded objects which is capable of igniting coating materials. Inadequate grounding will cause a spark hazard. A spark can ignite many coating materials and cause a fire or explosion.	Parts being sprayed and operators in the spray area must be properly grounded. Parts being sprayed must be supported on conveyors or hangers that are properly grounded. The resistance between the part and earth ground must not exceed 1 meg ohm. (Refer to NFPA-33.) Operators must be grounded. Rubber soled insulating shoes should not be worn. Grounding straps on wrists or legs may be used to assure adequate ground contact. Operators must not be wearing or carrying any ungrounded metal objects. When using an electrostatic handgun, operators must assure contact with the handle of the applicator via conductive gloves or gloves with the palm section cut out. NOTE: REFER TO NFPA-33 OR SPECIFIC COUNTRY SAFETY CODES REGARDING PROPER OPERATOR GROUNDING. All electrically conductive objects in the spray area, with the exception of those objects required by the process to be at high voltage, must be grounded. Grounded conductive flooring must be provided in the spray area. Always turn off the power supply prior to flushing, cleaning, or working on spray system equipment. Unless specifically approved for use in hazardous locations, all electrical equipment must be located **outside** Class I or II, Division 1 or 2 hazardous areas, in accordance with NFPA-33. Avoid installing an applicator into a fluid system where the solvent supply is ungrounded. Do not touch the applicator electrode while it is energized.

AREA Tells where hazards may occur.	HAZARD Tells what the hazard is.	SAFEGUARDS Tells how to avoid the hazard.
Electrical Equipment 	**Electrical Discharge** High voltage equipment is utilized in the process. Arcing in the vicinity of flammable or combustible materials may occur. Personnel are exposed to high voltage during operation and maintenance. Protection against inadvertent arcing that may cause a fire or explosion is lost if safety circuits are disabled during operation. Frequent power supply shut-down indicates a problem in the system which requires correction. An electrical arc can ignite coating materials and cause a fire or explosion.	Unless specifically approved for use in hazardous locations, the power supply, control cabinet, and all other electrical equipment must be located outside Class I or II, Division 1 and 2 hazardous areas in accordance with NFPA-33 and EN 50176. Turn the power supply OFF before working on the equipment. Test only in areas free of flammable or combustible material. Testing may require high voltage to be on, but only as instructed. Production should never be done with the safety circuits disabled. Before turning the high voltage on, make sure no objects are within the sparking distance.
Toxic Substances 	**Chemical Hazard** Certain materials may be harmful if inhaled, or if there is contact with the skin.	Follow the requirements of the Safety Data Sheet supplied by coating material manufacturer. Adequate exhaust must be provided to keep the air free of accumulations of toxic materials. Use a mask or respirator whenever there is a chance of inhaling sprayed materials. The mask must be compatible with the material being sprayed and its concentration. Equipment must be as prescribed by an industrial hygienist or safety expert, and be NIOSH approved.
Spray Area 	**Explosion Hazard — Incompatible Materials** Halogenated hydrocarbon solvents for example: methylene chloride and 1,1,1, - Trichloroethane are not chemically compatible with the aluminum that might be used in many system components. The chemical reaction caused by these solvents reacting with aluminum can become violent and lead to an equipment explosion.	Spray applicators require that aluminum inlet fittings be replaced with stainless steel. Aluminum is widely used in other spray application equipment - such as material pumps, regulators, triggering valves, etc. Halogenated hydrocarbon solvents must never be used with aluminum equipment during spraying, flushing, or cleaning. Read the label or data sheet for the material you intend to spray. If in doubt as to whether or not a coating or cleaning material is compatible, contact your coating supplier. Any other type of solvent may be used with aluminum equipment.

EUROPEAN ATEX DIRECTIVE 94/9/EC, ANNEX II, 1.0.6

The following instructions apply to equipment covered by certificate number Sira 05ATEX5127X:

1. The equipment may be used with flammable gases and vapors with apparatus groups II and with temperature class T6.

2. The equipment is only certified for use in ambient temperatures in the range +12.8°C to +55°C and should not be used outside this range.

3. Installation shall be carried out by suitably trained personnel in accordance with the applicable code of practice e.g. EN 60079-14:1997.

4. Inspection and maintenance of this equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice e.g. EN 60079-17.

5. Repair of this equipment shall be carried out by suitable trained personnel in accordance with the applicable code of practice e.g. EN 60079-19.

6. Putting into service, use, assembling, and adjustment of the equipment shall be fitted by suitably trained personnel in accordance with the manufacturer's documentation.

   Refer to the "Table of Contents" of this service manual.
   a. Installation
   b. Operation
   c. Maintenance
   d. Parts Identification

7. Components to be incorporated into or used as replacement parts of the equipment shall be fitted by suitably trained personnel in accordance with the manufacturer's documentation.

8. The certification of this equipment relies upon the following materials used in its construction:
   If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection provided by the equipment is not compromised.

   Aggressive substances: e.g. acidic liquids or gases that may attack metals, or solvents that may affect polymeric materials.

   Suitable precautions: e.g. regular checks as part of routine inspections or establishing from the material's data sheets that it is resistant to specific chemicals.

   Refer to "Specifications" in the "Introduction" section:

   a. All fluid passages contain stainless steel or nylon fittings.
   b. High voltage cascade is encapsulated with a solvent resistant epoxy.

9. A recapitulation of the certification marking is detailed in the "ATEX" section, on the next page, drawing numbers: 80108, A13850, A13851, and A13384.

10. The characteristics of the equipment shall be detailed e.g. electrical, pressure, and voltage parameters.

    The manufacturer should note that, on being put into service, the equipment must be accompanied by a translation of the instructions in the language or languages of the country in which the equipment is to be used and by the instructions in the original language.

EVOLVER 500 SERIES A13758 ATEX PRODUCT MARKING DEFINITIONS

Ex Certificate Number: Sira 05Atex5127X

Sira = Notified Body performing EC-type examination
05 = Year of certification
ATEX = Reference to ATEX Directive
5 = Protection Concept Code (code 5 is titled Encapsulation)
127 = Document serial number

Product Marking

CE 2813 Ex II 2 G T6

X = Special conditions for safe use apply

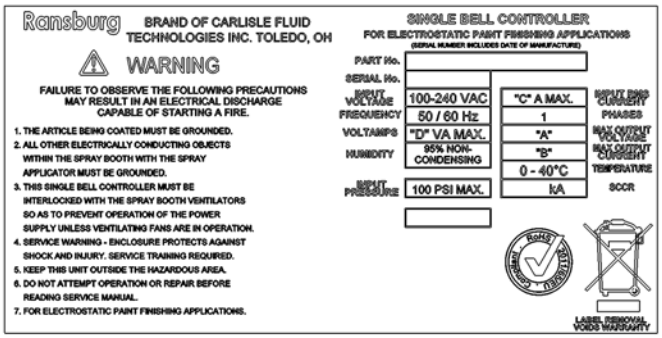
Ex = Specific marking of explosive protection
II = Equipment Group hazardous area characteristics
2 = Equipment Category
G = Type of explosive atmosphere (gases, vapors, or mists)
T6 = Temperature classification.

Power Supply Marking

CE 2813 Ex II (2) G

Special conditions for safe use:

- The Evolver 500 Series Applicator shall only be used with associated A13613-0X1401X2 Micropak 2e Power Supply according to configuration drawing A13804.
- The safe Distance of use for the Evolver 500 Series Applicator is 102mm minimum: from the electrode to earthed parts. The end user must ensure this distance, as a minimum is maintained and that grounded objects are prevented from contacting the applicator bell cup when the applicator is energized or operating.
- The Micropak 2e is intended for “Safe Area Use” only.
- The Evolver 500 Series is a potential hazard - refer to the manufacturers instructions.
- The end user must insure that installation is in accordance with all applicable requirements of EN 50 176. This includes the means of fire protection and fire detection being installed with this system.
- Before servicing applicator insure that all voltage is completely de-energized. Minimum 1 minute wait after voltage has been shut off.
- If ignitable fluids are used for cleaning purposes, all parts must be completely discharged of high voltage.
- The fluid supply system must be properly grounded.
- If an object is within the 102mm safe distance, it must be cleared prior to restarting and/or re-energizing the system.
- The materials used in the construction of this equipment contain levels of Al, Mg, Ti and Zi that are greater than that allowed for EPL Ga and Gb by clause 8.3 of EN 60079-0, therefore in rare cases, ignition sources due to impact and friction sparks could occur. The equipment shall therefore be protected from such impact and friction when installed.
- The type Evolver 500 Series and type Micropak 2e (A13613-001412XXX) power supply complies with EN 50 176: 2009. Clauses 4, 5.1, 5.2.1, 5.2.2, 5.2.3, 5.2.4, 5.3, 5.5.1, 5.5.3, 5.5.5, 5.6, 6.1, 6.4, 7.2, 7.3 and 7.4. All remaining clauses of EN 50 176: 2009 are to be addressed during installation.
- The installer shall fix the warning sign that is supplied with these products in a position close to the equipment; in addition, it shall also be clearly visible to the operator.



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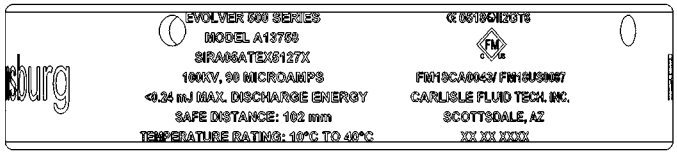

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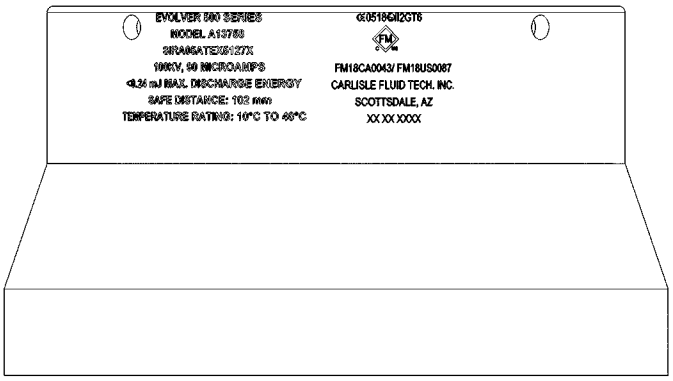

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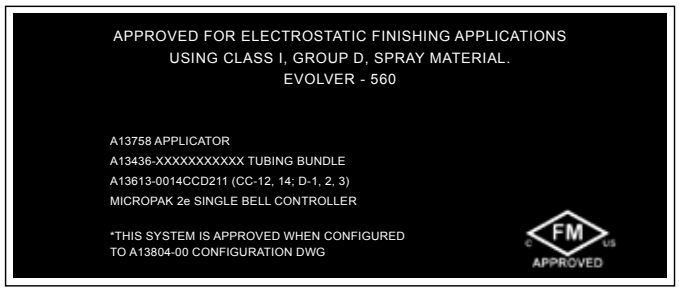

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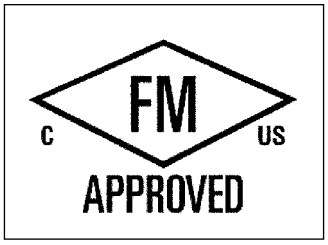

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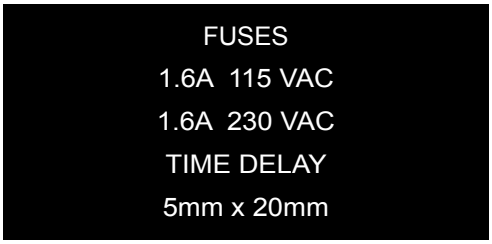


A13912-00

FM/ATEX Configurations

These applicators are FM and ATEX approved when configured to drawings shown on pages 54 thru 69.

INTRODUCTION

THE RANSBURG ELECTROSTATIC PROCESS

This process is a method for electrostatically applying coatings to objects. A power supply produces a high voltage charge which is supplied to the applicator, creating an electrostatic field between the applicator and the target object. The target is electrostatically grounded through its support which may be either stationary or moving.

A regulated fluid system delivers coating material to the applicator, where it is atomized forming a spray mist. There, under the influence of the electrostatic field, the atomized coating becomes electrostatically charged. The charged particles are attracted to and deposited on the grounded target object. The forces between the charged particles and the target are sufficient to turn overspray around and deposit it on the back surface of the target. Therefore, a higher percentage of the spray is deposited.

EVOLVER 500 SERIES DUAL PURGE SOLVENTBORNE PAINT SPRAY APPLICATORS

The **Evolver™ 500 Series Dual Purge Spray Applicators System** will allow for the use of spray applicators or bell applicators with minimal required down-time during the switching process. This system can also operate as a spray applicator system only that later can be upgraded to allow for bell applicators having "Unilink Technology"to be used. This system can allow a user currently possessing an RMA bell system to use spray applicators as well, with minimal conversion required. Lastly, this system is a true dual purge system in that paint can be sprayed with full voltage on, while simultaneously color changing the second paint line. The Evolver 500 Series Dual Purge Solventborne Applicator line consists of both 60° and 90° single and dual-headed 100kV automatic electrostatic applicators. Developed for use on robot, the Evolver 500 Series Dual Purge spray applicator incorporates a one piece slide over manifold cover, providing the user an efficient tool for the electrostatic application of coatings.

There are two single-head models of the Evolver 500 Series Dual Purge Applicators **(see Figure 1)**. Each model differs in the applicator to axis orientation of the spray head. These models are:

- A13758-0XXXXX 60° Single-Head
- A13758-1XXXXX 90° Single-Head

Two dual-head versions of the Evolver 500 Series Dual Purge Applicator are also available **(see Figure 1)**. The dual-headed applicators are primarily used where high volume fluid delivery is required. The dual-headed applicator is available in two different configurations as follows:

- A13758-2XXXXX 60° Dual-Head
- A13758-3XXXXX 90° Dual-Head

The Evolver 500 Series Dual Purge Spray Applicator System consists of four major components:

1. Spray Head
2. Applicator Head Mounting Block Assembly
3. Valve Manifold Assembly (Includes the High Voltage Cascade with a Quick-Disconnect Ring)
4. Rear Tubing Manifold Assembly

The spray head(s) and valve manifold contain the fluid, air, and high voltage passages. All fluid passages contain stainless steel and/or nylon fittings, compatible with halogenated hydrocarbon solvents. The robot manifold incorporates stainless steel fluid connections.

The high voltage cascade is entirely encapsulated with a solvent resistant epoxy. This cascade generates voltages up to 100kV fed by a low voltage cable.

There is one source for the high voltage supply to the Evolver 500 Series Dual Purge Applicators:

- MicroPak™ 2e Part No.: A13613-0014XXXXXX

The MicroPak 2e Power Supply control unit provides a low voltage signal through the robot manifold to the spray applicator. The high voltage cascade located within the applicator converts the low voltage DC signal to a high voltage electrostatic output.

For applications that have the ability to control fan and atomization air remotely, the bleed style head is available.

When this version is selected, there is no internal air valve to trigger the air supply to fan and atomization passages. The external controls are used exclusively.

Conventional air spray guns pass virtually all the input pressure to the air cap. LVMP (Trans-Tech) is higher pressures than HVLP (10psi, 0.7 bar Atomizing Pressure) but substantially lower than conventional. LVMP is nearly as efficient as HVLP but will render a finish much closer to conventional.

SPECIFICATIONS

Robot/Mounting Compatibility:	All hollow wrist robots
Applicator Control Unit:	MicroPak 2e Control Unit - A13613
Operating Temperature Range:	55°F (12.8°C) to 104°F (40°C)
Weight:	
60° Single-Headed	9.02 lb. (4.1 Kg)
90° Single-Headed	8.71 lb. (3.9 Kg)
60° Dual-Headed	10.91 lb. (4.9 Kg)
90° Dual-Headed	10.76 lb. (4.9 Kg)
A12373-XX Manifold	6.82 lb. (3.1 Kg) (No tubing or cable)
Length:	
60° Single-Headed	16.5-inch (419 mm)
90° Single-Headed	13.6-inch (345 mm)
60° Dual-Headed	15.8-inch (401 mm)
90° Dual-Headed	12.4-inch (315 mm)
Tubing Manifolds Lengths (Metric):	
A13436-000100XXXXX	No tubing included
A13436-010100XXXXX	9m, Single Purge, No F.O. Cable
A13436-020100XXXXX	9m, Dual Purge, No F.O. Cable
Output Voltage:	30-100 kV
Output Range:	0-85 µA
Paint Flow Rate:	Variable to 1500 cc/min. (Depending on viscosity & configuration)
Trigger Response Time:	134ms Open, 318ms Closed
Operating Air Pressures:	
Atomizing Air:	100 psig (6.9 bar) max.
Fan Air:	100 psig (6.9 bar) max.
Trigger Pilot:	70 psig min./100 psig (4.8 - 6.9 bar) max.
Dump Pilot:	70 psig min./100 psig max. (4.8 - 6.9 bar)
Operating Fluid Pressure:	150 psig (10.3 bar) max.

ROBOT MANIFOLD TUBING REQUIREMENTS

	Tubing Bundle Metric
Atomizing Air	8mm OD Nylon
Fan Air	8mm OD Nylon
Trigger Air	6mm OD Nylon
Dump Pilot	4mm OD Nylon
Fluid	8mm OD (Non-Shielded)
Dump	7mm ID

EVOLVER 500 SERIES DUAL PURGE APPLICATOR ASSEMBLY

A13758 - A BB C D E

Head Configuration

0 = 60° Single Head
1 = 90° Single Head
2 = 60° Dual Head
3 = 90° Dual Head

Manifold Configuration

00 = Single Purge, Electrostatic Cascade, for Highly Resistive Materials
01 = Single Purge, Electrostatic Cascade, for Conductive Materials
02 = Single Purge, Electrostatic Cascade, for Highly Conductive Materials
03 = Dual Purge, Electrostatic Cascade, for Highly Resistive Materials
04 = Dual Purge, Electrostatic Cascade, for Conductive Materials
05 = Dual Purge, Electrostatic Cascade, for Highly Conductive Materials
06 = Single Purge, Non-Electrostatic Cascade, for Highly Resistive Materials
07 = Single Purge, Non-Electrostatic Cascade, for Conductive Materials
08 = Single Purge, Non-Electrostatic Cascade, for Highly Conductive Materials
09 = Dual Purge, Non- Electrostatic Cascade, for Highly Resistive Materials
10 = Dual Purge, Non-Electrostatic Cascade, for Conductive Materials
11 = Dual Purge, Non-Electrostatic Cascade, for Highly Conductive Materials
12 = Single Purge for Highly Resistive Materials, Electrostatic Cascade-Split Shroud
13 = Single Purge for Conductive Materials, Electrostatic Cascade-Split Shroud
14 = Single Purge for Highly Conductive Materials, Electrostatic Cascade-Split Shroud
15 = Dual Purge for Highly Resistive Materials, Electrostatic Cascade-Split Shroud
16 = Dual Purge for Conductive Materials, Electrostatic Cascade-Split Shroud
17 = Dual Purge for Highly Conductive Materials, Electrostatic Cascade-Split Shroud
18 = Single Purge for Highly Resistive Materials, Non-Electrostatic Cascade-Split Shroud
19 = Single Purge for Conductive Materials, Non-Electrostatic Cascade-Split Shroud
20 = Single Purge for Highly Conductive Materials, Non-Electrostatic Cascade-Split Shroud
21 = Dual Purge for Highly Resistive Materials, Non-Electrostatic Cascade-Split Shroud
22 = Dual Purge for Conductive Materials, Non-Electrostatic Cascade-Split Shroud
23 = Dual Purge for Highly Conductive Materials, Non-Electrostatic Cascade-Split Shroud

Atomization Technology

0 = Conventional Spray/ Non-Bleed (Black Head)
1 = HVLP Spray/ Non-Bleed (Black Head)
2 = Conventional Spray/ Bleed (Black Head)
3 = HVLP Spray/ Bleed (Black Head)
4 = Trans-Tech/ Non-Bleed (Black Head)
5 = Trans-Tech/ Bleed (Black Head)

Quick Disconnect Ring

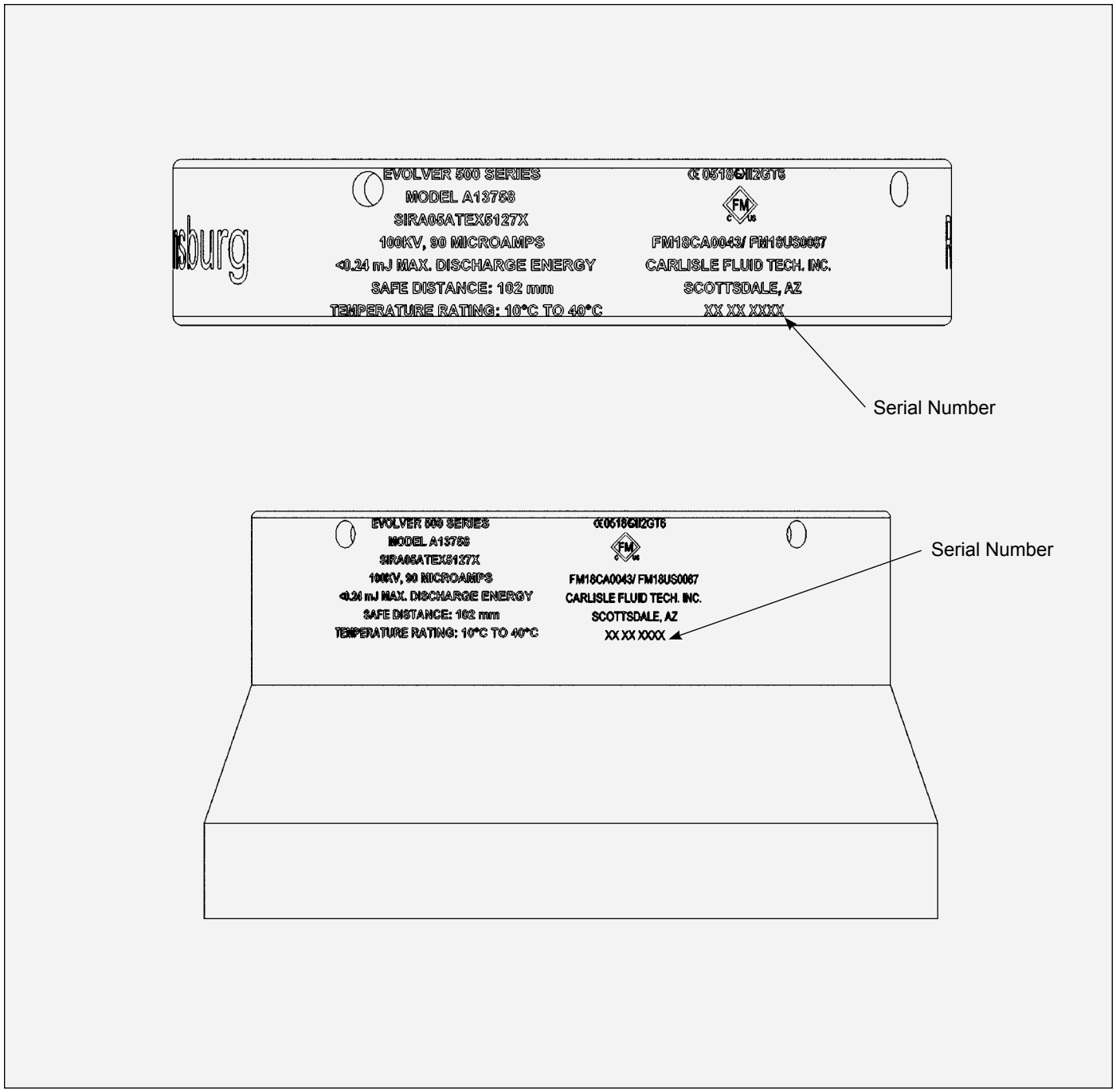
0 = Stainless Steel Ring
1 = Black Plastic Ring
2 = Stainless Steel FM/ATEX Ring
3 = Black Plastic FM/ATEX Ring

Tool Kit

0 = No Tool Kit
1 = Evolver Tool Kit

IMPORTANT NUMBERS

Record these numbers in a log book for future reference.



Mounting Ring and Atomizer Serial Number

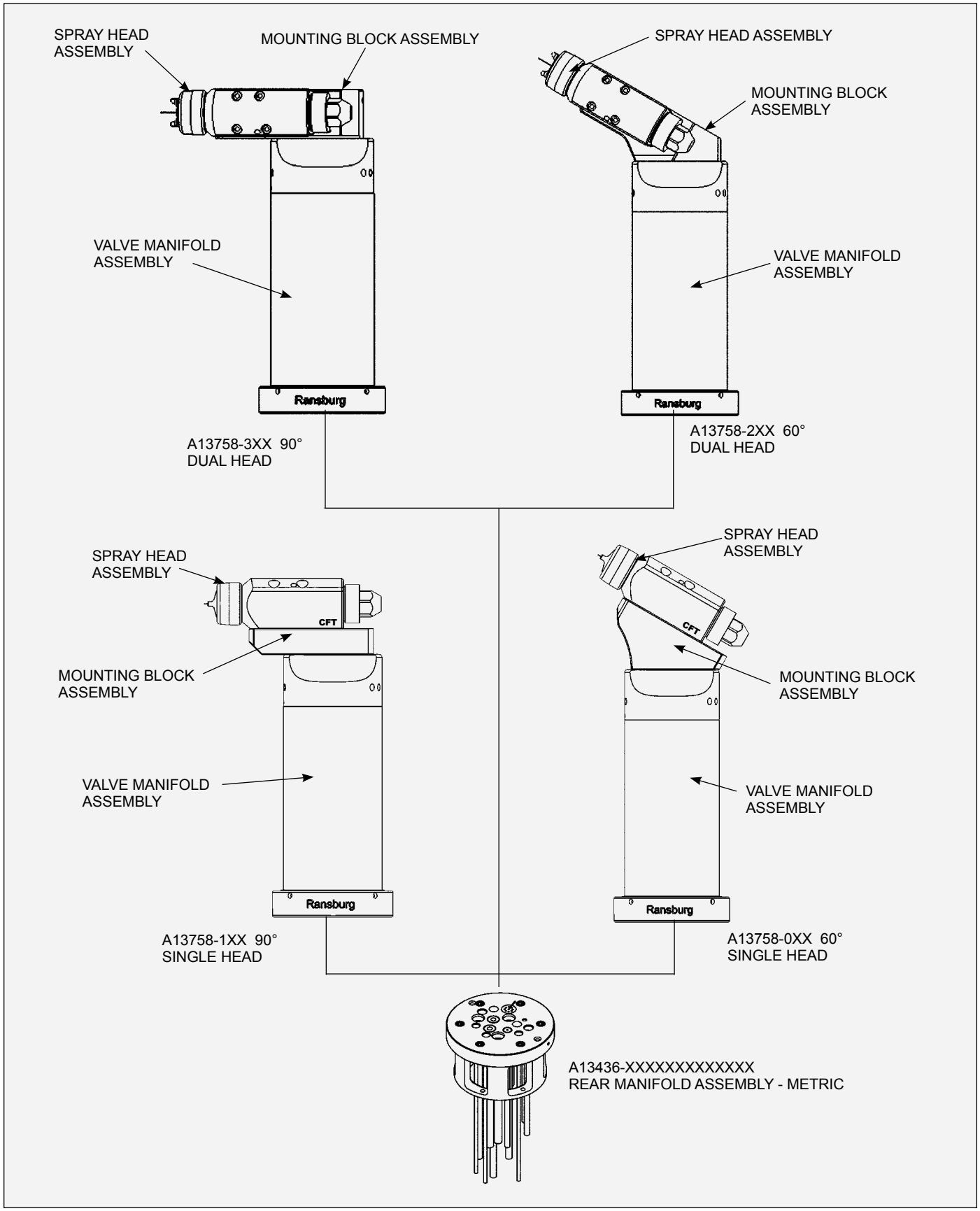


Figure 1: Evolver 500 Series Dual Purge Solventborne Robotic Applicators

FEATURES

The features of the Evolver 500 Series Dual Purge Series Applicators include:

- Secure bolted spray head.
- High quality Ransburg air cap and fluid nozzle.
- Various adapter plates available to match most robotic mounting configurations.
- No external high voltage cable. The internally mounted high voltage cascade requires only low voltage control wiring.
- Less waste to the spray booth with the dump valve located internally next to the feed tube.
- Assembly components made of durable engineered resin material for optimum mechanical strength and solvent resistance.
- Heavy duty design ensures excellent service life even when subjected to the quick motions of robotic applicators.
- Small, light weight package allows for better maneuverability in tight areas.
- Negligible maintenance down time with the quick-disconnect feature. An atomizer can be exchanged in less than two minutes for off-line maintenance.
- Field proven high voltage system.
- Quick color change capability.
- Clean interior design with slip-on shroud or split shroud options.
- Internal fan and atomization air control valve, with a mechanically timed trigger sequence.
- Color coded air and trigger actuation lines.
- Quick change to a RMA bell applicator.
- True dual purge technology, allowing the user to spray one color at voltage, while simultaneously purging the second color.

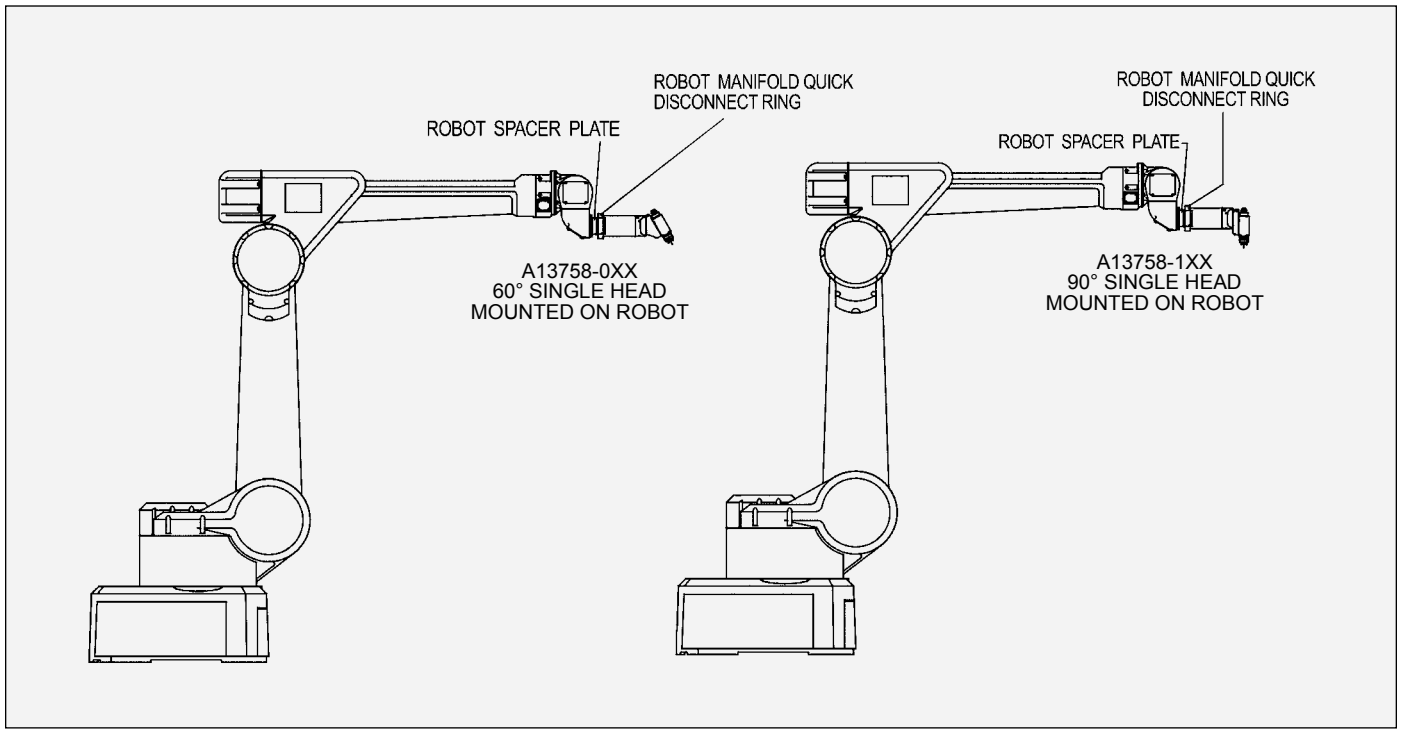


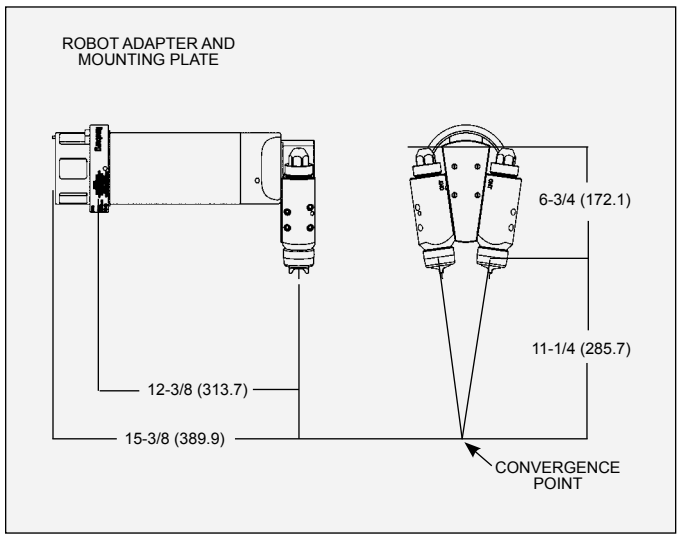
Figure 2: Typical Robotic Applicator Mounting

A13758-XXX EVOLVER DUAL PURGE SPRAY APPLICATOR ASSEMBLY

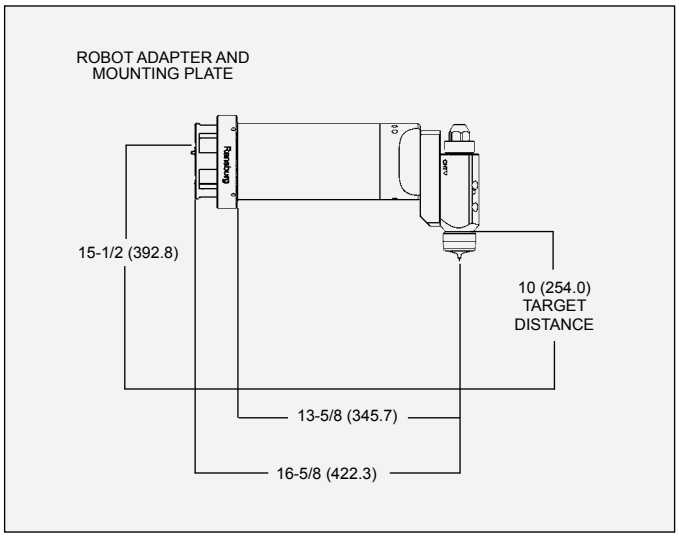
The spray applicator assembly is designed to connect to hollow wrist robots. A low voltage control cable is supplied with the tubing bundle to connect the cascade to the MicroPak 2e power supply.

Tool Center-Point

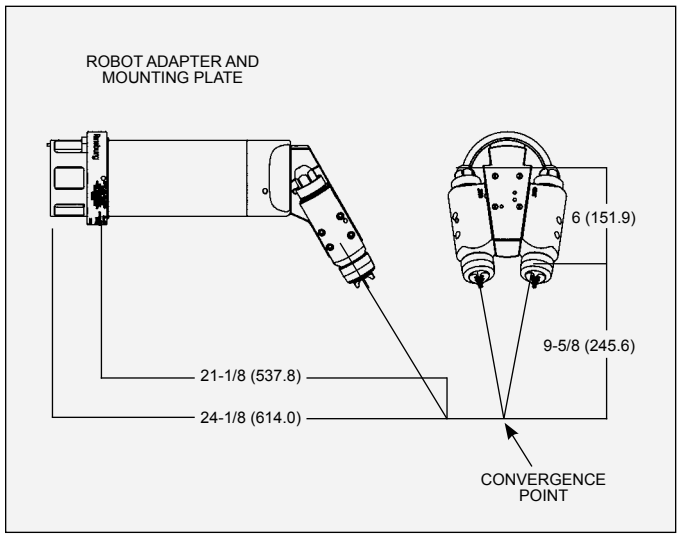
Figure 3 shows the tool center-point information for the four applicators. For dual head applicators, the tool center-point is based upon the convergence point. For the single head applicators it is based upon a 10" (254mm) target distance.



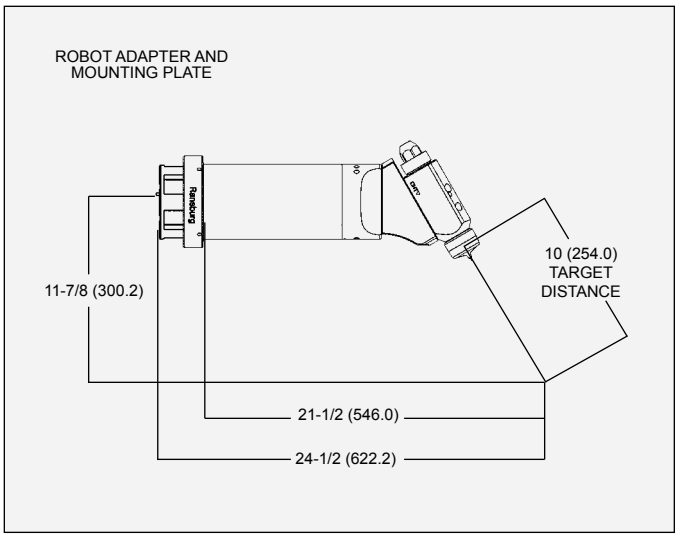
DUAL HEAD 90°



SINLGE HEAD 90°



DUAL HEAD 60°



SINGLE HEAD 60°

Figure 3: Tool Center-Point

INSTALLATION

EVOLVER 500 SERIES DUAL PURGE ROBOTIC ATOMIZER INSTALLATION

This information is intended **ONLY** to indicate the general installation parameters of this product and, where applicable, its working relationship to other Ransburg system components in typical use. Each installation is unique and should be directed by an authorized Ransburg representative or conducted from the Ransburg installation drawings provided for your particular installation.

POWER SUPPLY ASSEMBLY

Refer to the most current Power Supply Unit manuals for complete information regarding power supply installation.

- MicroPak 2e Control Unit (A13613)

MOUNTING

The Evolver 500 Series dual purge is equipped with a quick disconnect assembly. The quick disconnect feature consists of a robot plate which is permanently attached to the robot through a wrist adapter plate and a mating rear plate which is part of the Evolver 500 Series Dual Purge Spray Applicator assembly. The applicator is secured to the robot plate with a threaded retaining ring.

ELECTRICAL AND FIBER OPTIC CONNECTIONS

The fiber optic cable is included in the Evolver 500 Series dual purge tubing bundle, but not used. It is there, ready to use, in case a user is using or chooses to use in the future, a bell applicator, which requires the fiber optic cable. The fiber optic connection is made on the back of the applicator's robot plate. The fiber optic cable comes preassembled with connectors that are secured in place by set screws tightened from the side of the robot plate. An adequate ground must be provided to the mounting plate to ensure that fluid fittings, etc. are at ground potential.

FLUID CONNECTIONS

The paint, solvent, and dump fluid tubing are connected on the back of the robot plate with stainless steel compression fittings and PFA tubing. Fluid tubing requirements are shown in the "Signal Identification Tables" in the "Installation" section.

TYPICAL INSTALLATION

Figure 4 shows a typical installation of the Evolver 500 Series dual purge and the wiring installation of the applicator with the MicroPak 2e.

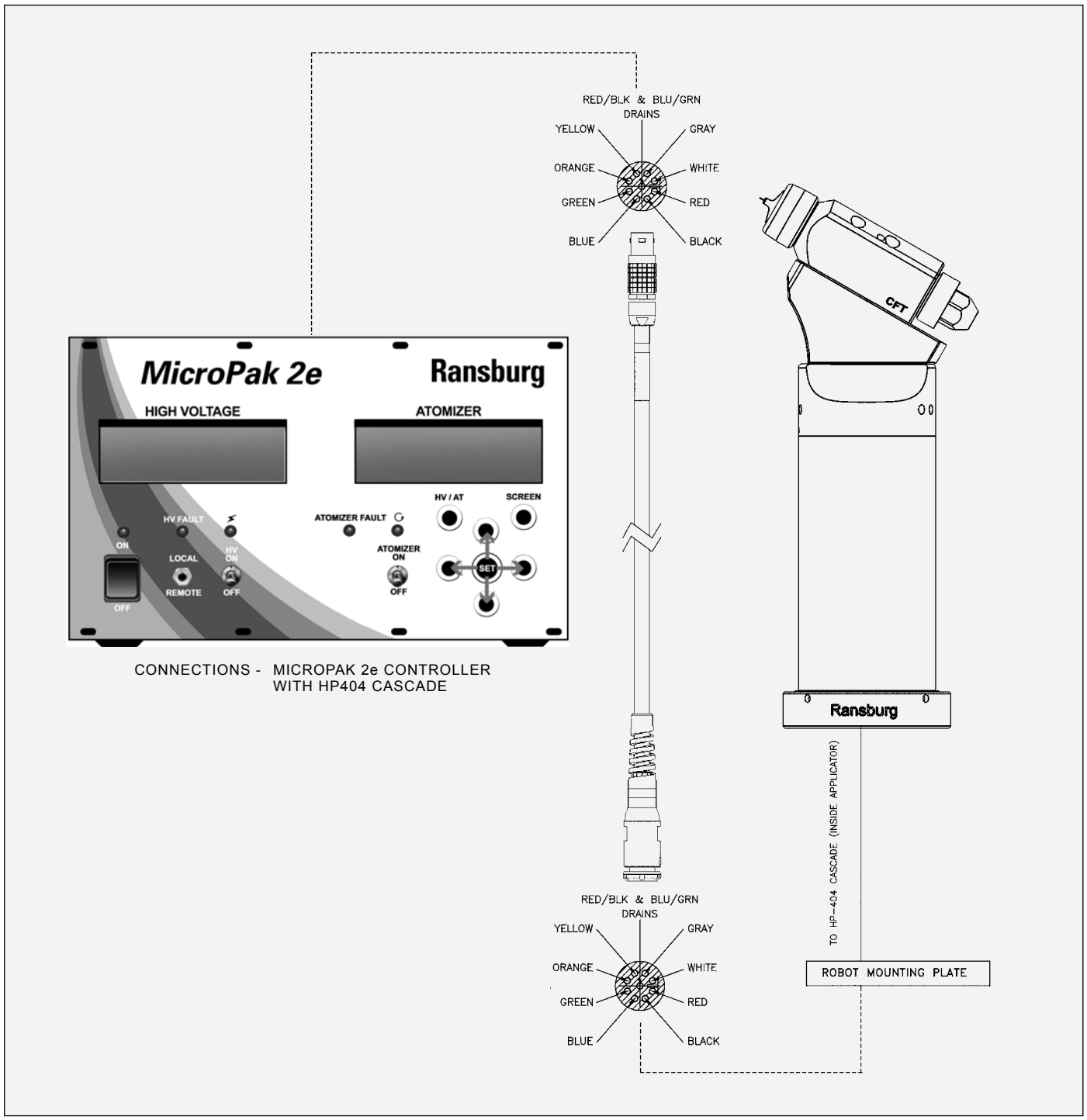


Figure 4: Low Voltage Cable Connections

⚠ WARNING

➤ The high voltage controller **MUST** be located outside the **HAZARDOUS** area (Reference OSHA, NFPA-33, EN50176, and your insurance company requirements.)

➤ User should be aware of, and adhere to, all local fire codes and ordinances.

⚠ WARNING

➤ The user **MUST** provide a properly fused disconnect between the power source and the applicator high voltage controller which complies with appropriate codes.

➤ Fluid supply must be grounded per NFPA-33 and EN50176.

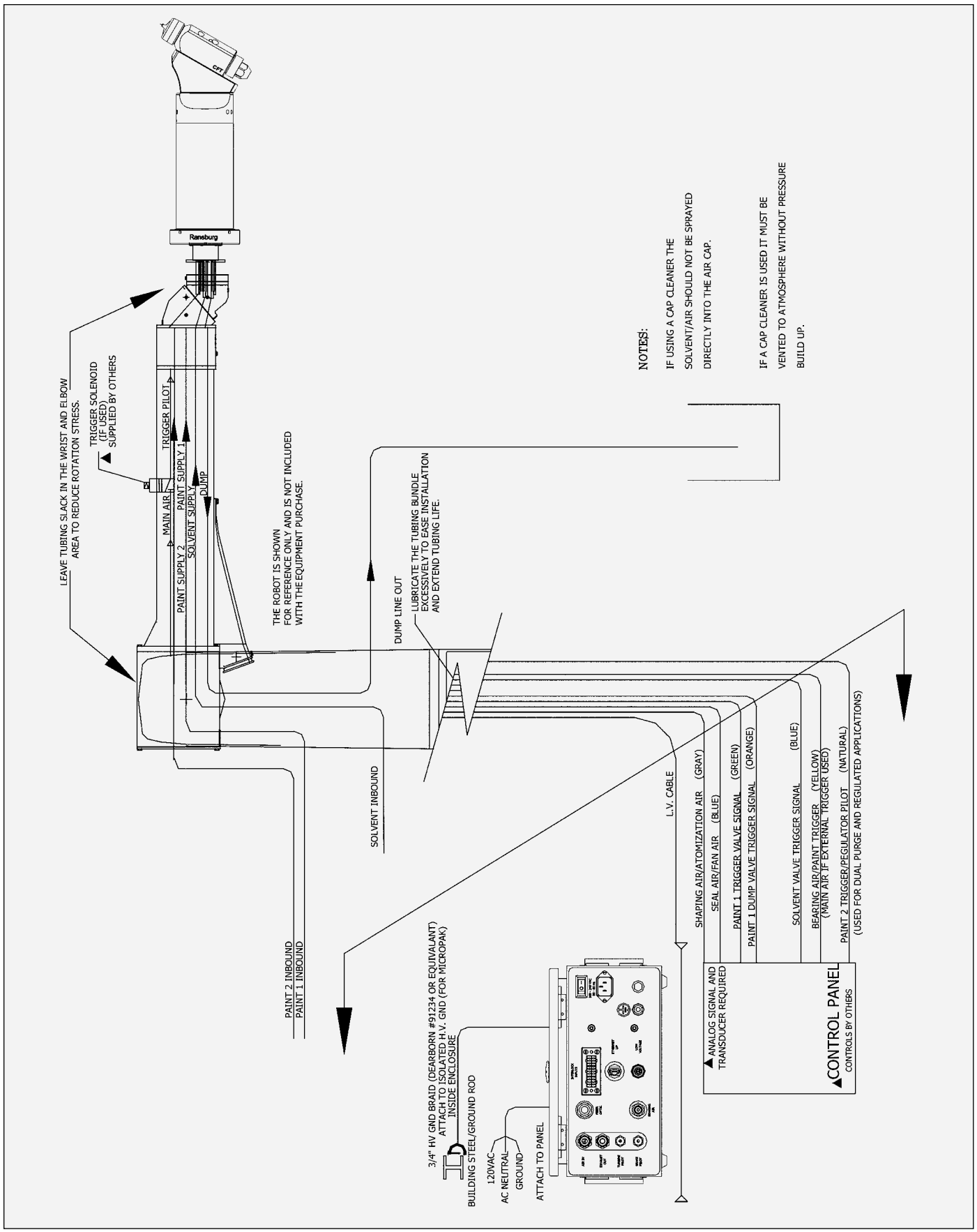


Figure 5: Evolver 500 Series Dual Purge Spray Applicator Air And Fluid Layout

APPLICATOR AND MANIFOLD ASSEMBLY

(See Figures 4 and 5)

The tubing, hose, and low voltage cable come bundled from the factory. Pull the bundle through the robot spacer plate and robot wrist carefully to prevent any cuts on the cable or hoses. Use the six (6) socket head cap screws (76566-24C) included with the rear manifold tubing assembly to attach the rear manifold assembly (A13795) to the robot spacer plate (see Table 1).

Connect each signal line as required per "Signal Identification Tables (Metric) Tubing Bundles" in the "Installation" section.

Rear Plate Assembly

The rear plate assembly is designed to be at ground potential when mounted to the robot plate component within the tubing bundle assembly. The air and fluid ports are compactly oriented for use in robotic applications. The interior air supplies are ported through the five (5) support rods and also directly tubed to the upper manifold assembly. On the exterior side of the rear plate, the ports are provided with o-ring seals so that the applicator can be quickly mated and secured to the robot plate

Robot Plate

The robot plate is a component of the tubing bundle assembly and intended to be permanently mounted to the robot. A wrist adapter is also available, which matches the robot's mounting configuration. The incoming air lines, fluid lines, low voltage cable, and fiber optic cable are connected to the fittings provided on the back of the robot plate. The rear plate of the applicator assembly is secured to the robot plate with a threaded retaining ring.

Break-Away Feature (Optional)

The Evolver 500 Series dual purge can be converted to have a break-away feature, by replacing the five (5) stainless steel screws with five (5) special designed plastic screws (77524-00). This feature is meant to reduce the damage to the applicator, robot, etc. If a collision occurs, the five (5) plastic break-away screws fail and the applicator will break free. This will leave the break-away ring and the mounting ring attached to the robot.

Power Supply and Controls

The high voltage cascade located inside the Evolver 500 Series dual purge is controlled by the MicroPak 2e control unit. The low voltage output of the MicroPak 2e is multiplied by the internal cascade to the high voltage level required. This eliminates the need for a high voltage cable. A low voltage cable interconnects the cascade and the MicroPak 2e control. The MicroPak 2e and the internal cascade will produce voltages up to 100,000VDC.

The MicroPak 2e is designed to electronically limit current to provide safe operation in a spray booth. The voltage and current draw of the applicator are continuously displayed on the MicroPak 2e control panel. Voltage and over-current limits are adjustable on the front of the MicroPak 2e. MicroPak 2e internal safety circuits will shut down the system on over-current and cable faults.

Robot Spacer Plate

The robot spacer plate is included with the robot manifold assembly to increase life of the tubing bundle. The extra spacing it provides increases the bend radius of the tubes and decreases the hose or cable stress at the connector.

There is only one way the spacer plate may be assembled to the mounting plate. The spacer plate has an alignment pin that may only engage in one hole position in the robot mount plate. This provides the final position to top dead center of the robot.

Fourteen (14) robot spacer plates shown in Table 1 are available for this product.

TABLE 1 - SPACER PLATES

Part No.	Description
79107-00	ABB 5400, 5002 Robots
78983-00	Fanuc P155, 145 Robots
79131-00	Fanuc P200/P-250 Robots
A10847-00	Adapter (Kawasaki-KE610L)
A10848-00	Adapter (Motoman-PX2850)
A10849-00	Adapter (Motoman-PX2900)
A10851-00	Adapter (B & M LZ2000)
A12036-00	Adapter (ABB 5400 Enhanced Wrist)
A13697-00	Motoman EXP2050
A13733-00	Fanuc P200-P250 Long
A13734-00	Kawasaki KE610L Long
A13735-00	ABB 5400 Enhanced Wrist Long
A13736-00	Motoman EPX 2050 Long
A13765-00	Motoman EPX 2900

LOW VOLTAGE CABLE INSTALLATIONS

(See Figures 6, 7, and 8)

A low voltage cable is provided to send power to the high voltage cascade in the applicator as well as sending important information during operation back to the MicroPak 2e controls. One piece of the cable is a permanent length of approximately 72-inches (1829mm) from the robot plate end. The connecting cable can be ordered in various lengths depending on the distance required to reach from the robot arm to the MicroPak 2e controller. The ends of the cables have a male and female quick disconnect end. This provides for a quick and easy removal of the cable at the robot plate if servicing or replacement is required.

It is important that the quick disconnect fitting be secured to a good ground source. The A12241-XX cable is supplied with a ground cable which can be secured to the bulkhead connector and the other end to a known ground source. The cable can also be grounded by attaching the bulkhead connector to a grounded bulkhead plate. The bulkhead plate can be no more than 1/8-inch (3.18mm) in thickness. The bracket should be made as in Figure 6 to hold the connector from turning. To mate the connectors, align the raised key section of the cable on the applicator end with the key groove of the cable that goes to the MicroPak 2e. Push the male end into the mating connector until an audible click is heard. Tug on cable to ensure that it is locked in place. To remove or disconnect the cable, pull back on the male connector shell and pull cable back at the same time. To remove this section from the robot plate, remove the applicator. Locate the set screw holding the flanged plastic 9 pin connector. Loosen with a 3/32" hex key wrench. Pull the cable out from the robot plate end. Install new cable in reverse direction, align the 9 pin connector with the alignment mark on the robot plate face and tighten set screw. Torque 5-10 lbs•in (0.56-1.13 Nm).

⚠ WARNING

➤ Cable connector shell must be electrically grounded. Electrical noise or other interference may result.

NOTE

➤ With the exception of fluid, dump, and bearing air/paint trigger, all other pilot and air supply lines should be connected to a bulkhead fitting and their diameters increased one nominal size. For example: atomization air should be increased to an 1/2" ID (12.7mm) from bulkhead plate to the volume booster.

NOTE

➤ If the length of the fan or atomization air lines exceeds 30-ft. (10m), the lines must be upsized to 1/2" ID (12.7mm for metric).

NOTE

➤ Trigger on and off time may be increased with a longer tube. Use as short a tube as practical. If a long tube must be used, adapt to a 6mm hose using a 8mm to 6mm adapter, such as part number KQ2H06 x 08 available from SMC.

NOTE

➤ Leave 12-24-inches (305-610mm) of extra length on all lines to prevent extreme tension being applied to these lines during robot movement. This increases tubing bundle life.

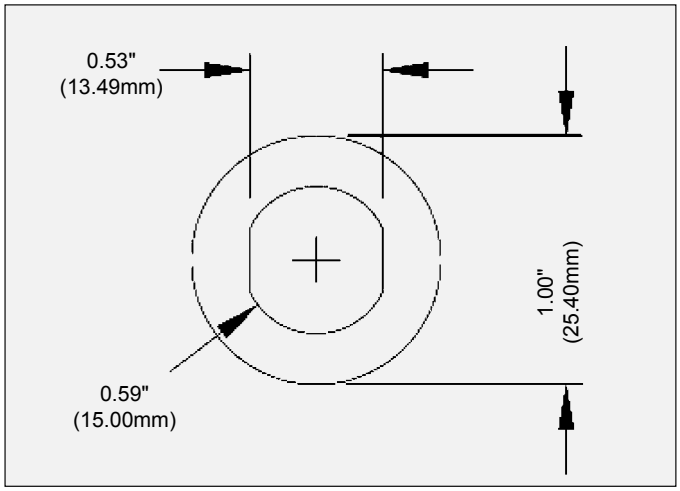


Figure 6: Bulkhead Cut-Out Diagram

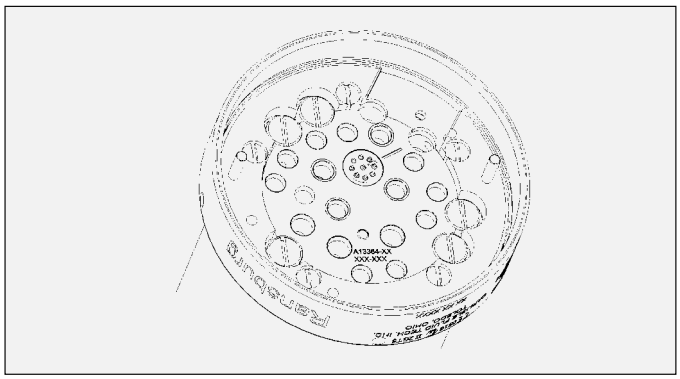


Figure 7: Robot Plate

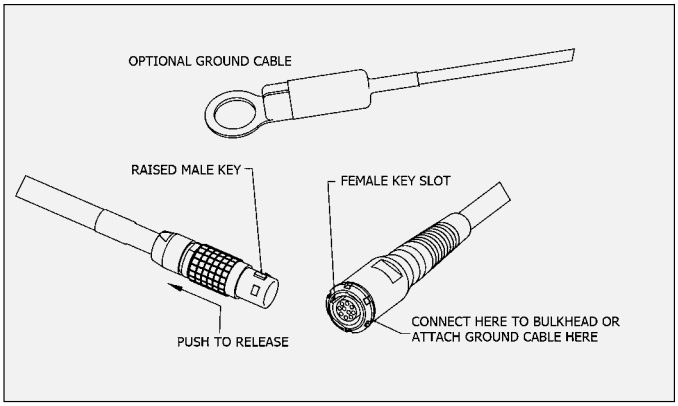


Figure 8: Quick-Disconnect Cables

⚠ CAUTION

➤ Do not exceed 100-ft. (30m) combined length of the low voltage cables.

⚠ WARNING

➤ If a non-explosion proof junction box/terminal strip is used, it must be located outside the hazardous area.

⚠ WARNING

➤ Install and route the hoses and cable so that they are **NOT** exposed to temperatures in excess of 120° F. Ensure that all hose and cable bends are **NOT LESS THAN** a 6-inch (152mm) radius and are not subjected to more than 360° of torsional twist. Failure to comply with these parameters could cause equipment malfunctions that might create **HAZARDOUS CONDITIONS!**

SIGNAL IDENTIFICATION TABLE FOR ROTARY APPLICATORS

Abbr.	Description	Color	Tubing Material	Tubing Size
B.A/P.T	Bearing Air (Paint Trigger)	Yellow	Nylon	6mm OD X 4mm ID
B.A RTN	Bearing Air Return	Yellow	Nylon	4mm OD X 2.7mm ID
BRK	Brake Air	Orange	Nylon	6mm OD X 4mm ID
DL1/DL2	Dump Line	Natural		10mm OD X 7mm ID
F.O	Fiber Optic Cable	Natural	Polyethylene	1/4" OD (jacket)
LV	Low Voltage Cable	Black	N/A	N/A
P1.IN/P2.IN	Paint In	Natural		5/16" OD X 3/16" ID
P1T	Paint 1 Trigger	Green	Nylon	4mm OD X 2.7mm ID
P2T	Paint 2 Trigger	Natural	Nylon	4mm OD X 2.7mm ID
P1D	Paint 1 Dump Trigger	Silver	Nylon	4mm OD X 2.7mm ID
P2D	Paint 2 Dump Trigger	Black	Nylon	4mm OD X 2.7mm ID
SA.I/A.A	Inner Shaping Air (Atom. Air)	Blue	Nylon	8mm OD X 6mm ID
SOL	Solvent In	Natural		6mm OD X 4mm ID
SA.O/F.A	Outer Shape Air (Fan Air)	Gray	Nylon	8mm OD X 6mm ID
ST/RP	Solvent Trigger Signal	Blue	Nylon	4mm OD X 2.7mm ID
T.A	Turbine Air	Natural	Nylon	10mm OD X 7mm ID

SPRAY / BELL APPLICATOR TRIGGERING

If you are currently using an RMA dual purge bell applicator system and want to add the Evolver 500 Series dual purge spray applicator system to spray using the same tubing bundle, a simple conversion must be made in order to allow for switching between spray and bell applicators. Figure 10 shows the recommended system that should be placed in the bearing air line between the main air input and the robot manifold plate. It is suggested that this circuit be placed on the robot arm. This system should also be used when the user is implementing the Evolver 500 Series dual purge spray applicator system and plans to use RMA dual purge bell applicators as well.

In Figure 10, the trigger solenoid must be an electronically activated, normally closed valve with exhaust, or a 3-way valve, with 100 psi or 6.8 bar max., 24VDC. Typically this solenoid already exists in the robot arm and can be used in this circuit. The spray applicator trigger/bearing air select valve must be a pneumatically activated, normally open solenoid. A suggested solenoid is P/N 11678-01. An additional solenoid must be used to activate the P1T/P2T (Paint Trigger) valve. If any of these solenoids are located inside a hazardous area, they must be explosion proof.

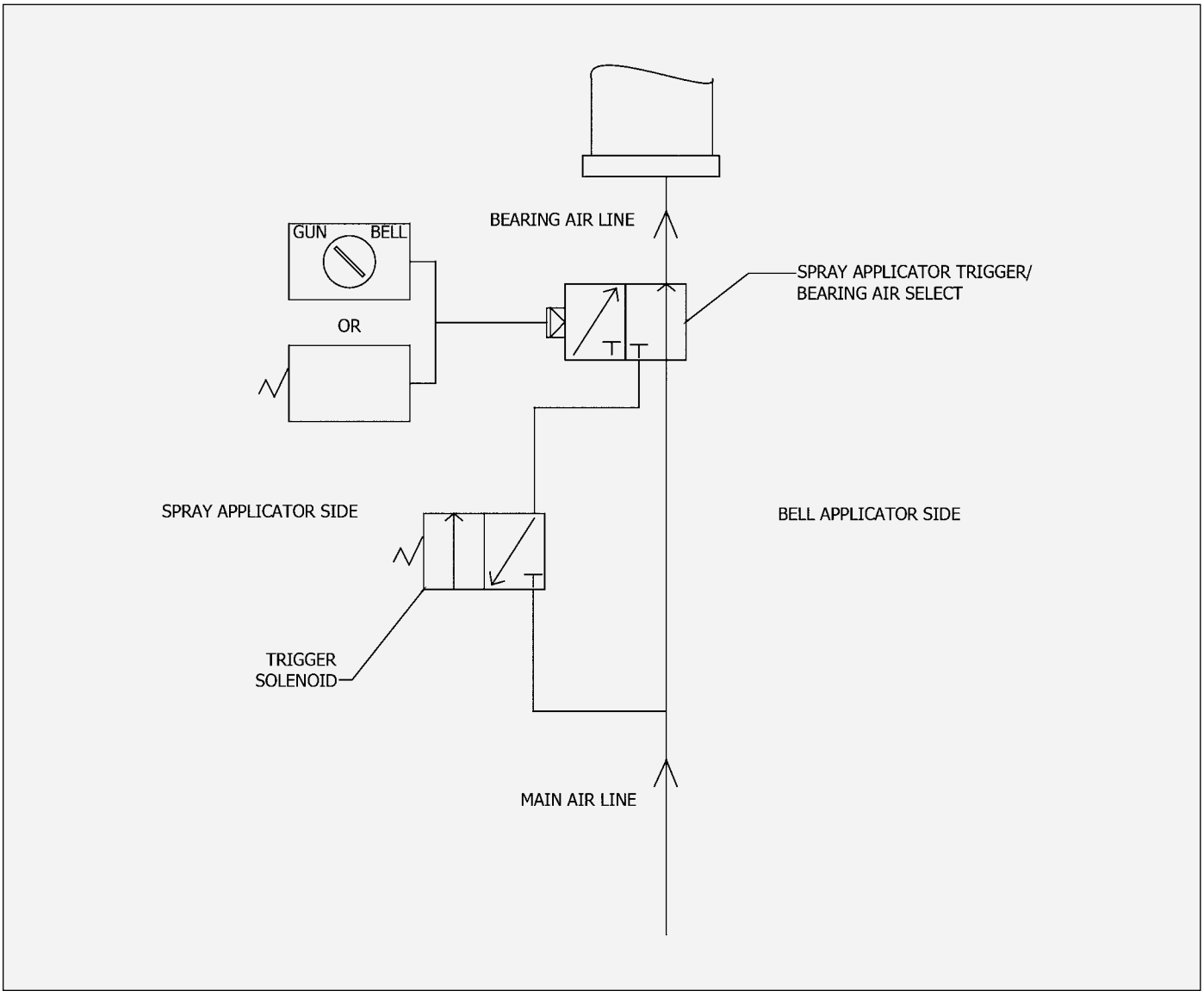


Figure 9: Conversion Schematic

TUBING BUNDLE INSTALLATION

Typically, the tubing bundle is pulled through the robot arm from the robot wrist side. Keep the bundle taped except for the portion of the bundle that will be inside the arm. Pull the tubing through the wrist and arm, leaving about 250mm (10-inch) of tubing sticking out of the front of the wrist plate **(see Figure 10)**.

Fasten the cable bundle in the robot at the rear exit of the arm. Push the robot spacer plate and applicator mounting plate to the robot wrist plate aligning the top dead center marks of the spacer plate and robot wrist plate. Fasten using appropriate screws. Installing the tubing bundle in this fashion will increase tubing bundle life significantly.

BUNDLE LUBRICATION

When the tubing bundle is installed, it should be lubricated with a generous amount of lubricant to increase the service life of the tubes. A recommended lubricant is Shell Alvania EP #02. There are other lubricants that are available for use. Prior to using a lubricant, ensure it is silicone free, resists heat breakdown, and is compatible with the materials being applied.

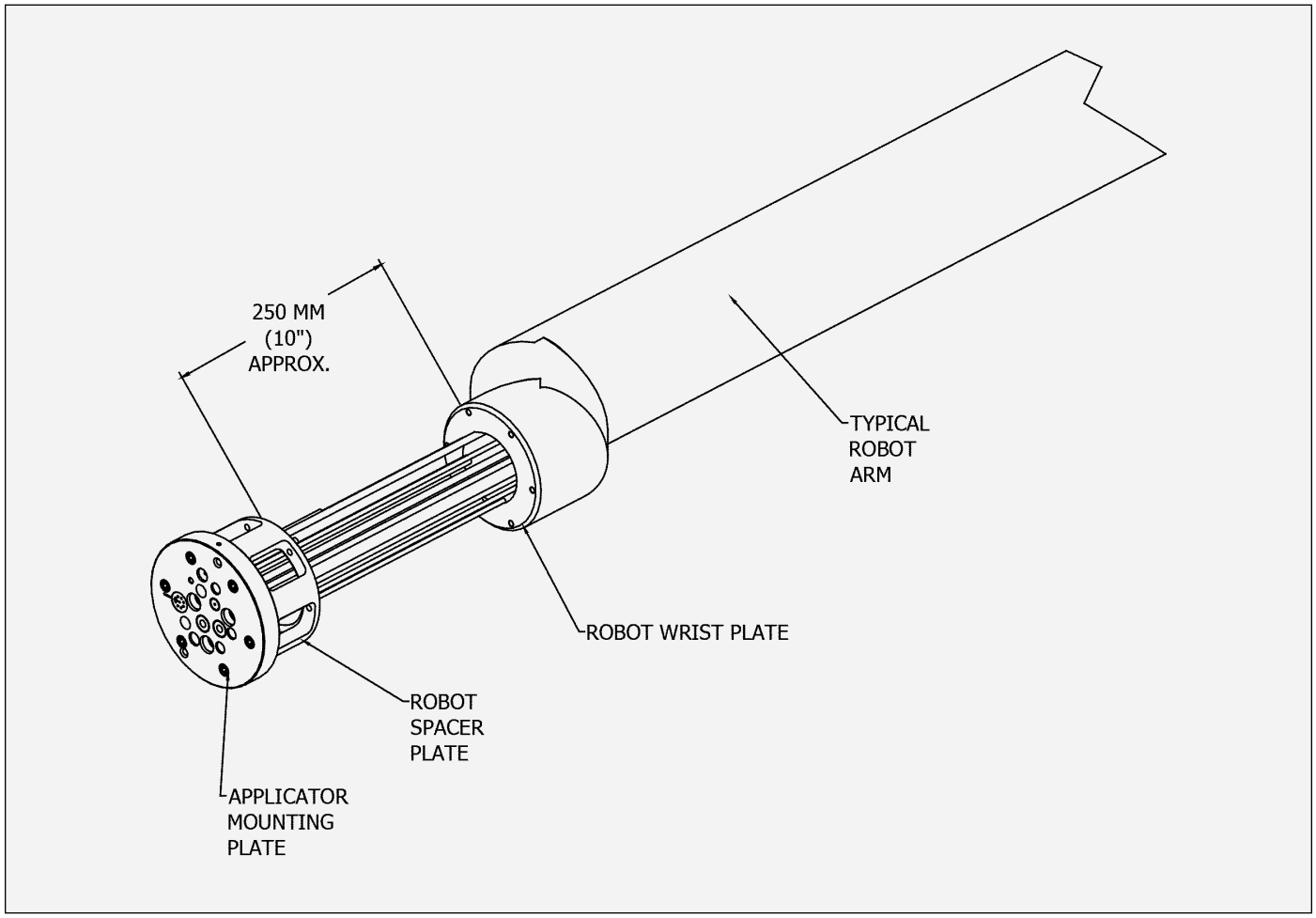


Figure 10: Tubing Bundle Installation

OPERATION

⚠ WARNING

➤ Operators must be fully trained in safe operation of electrostatic equipment. Operators must read all instructions and safety precautions prior to using this equipment (see NFPA-33).

As with any spray finishing system, operation of the Evolver 500 Series dual purge involves properly setting the operating parameters to obtain the best finish quality for the coating material being sprayed, while maintaining correct operation and reliability of the equipment used. Adjustments to operating parameters, which cover spraying, cleaning, and on/off control, include the following:

- Coating Materials
- Fluid Flow Rate Control
- Fluid Valve / Trigger Control
- Atomization Air (Paint Atomization Control)
- Fan Air (Pattern Control)
- Electrostatic Voltage
- Target Distance

⚠ WARNING

➤ Electrical discharge of a high electrical capacitance fluid/paint system can cause fire or explosion with some materials. If arcing occurs when a specific coating material is used, turn the system off and verify that the fluid is non-flammable. In these conditions, the system is capable of releasing sufficient electrical and thermal energy to cause ignition of specific hazardous materials in the air.

SPRAY APPLICATOR CONTROLS

Atomization Air (SAI/AA) / Fan Air (SAO/F.A)

The atomization and fan air are turned on by the trigger line and are controlled by an internal air valve located in the applicator head. During normal operation with applicator triggered off, there is a slight bleed of air through the atomization port.

Atomizing Air

Adjustments are made through the robot PLC or a manually adjustable air regulator. The lowest air pressure required to break up the paint should be used. Lower atomizing air pressures result in less overspray and increased transfer efficiency.

Fan Air

Adjusting the fan air increases or decreases the size of the spray pattern. Increasing pressure increases pattern size. Pattern adjustment should be made to suit the size and shape of the object being painted. This adjustment is made through the robot PLC or a manually adjustable air regulator.

Air cap atomization and fan pressures should be set and recorded using an air cap test kit. This provides a consistent measurement, so initial settings may be duplicated at any time. (See "Accessories" in the "Parts Identification" section.)

LVMP

LVMP (TransTech) is available standard on the Evolver 500 Series. LVMP operates on Lower Volume Medium Pressures. LVMP has higher transfer efficiency compared to standard air spray without electrostatics. With electrostatics, comparable efficiency is higher.

FLUID VALVE CONTROLS

Trigger and Dump (See Figure 11)

The fluid valves in the Evolver 500 Series dual purge are actuated by an air signal. The air pressure must exceed 70 psi (4.8 bar) to assure proper actuation of the valve. Applying air to the valve actuator turns on the fluid flow for the valve.

The paint trigger valve controls the paint flow to the applicator. When actuated, paint flows through the valve to the coiled fluid tube and into the spray head.

The dump valve controls the paint flow through the dump line. When actuated, paint flow is directed to the dump return line. This provides a method of rapidly removing paint from the incoming line for cleaning and/or color change. Normally, the dump valve is not actuated at the same time as the paint valve since the paint valve is intended to cause the fluid to flow to the applicator head at the prescribed input pressure.

DUAL PURGE SPRAYING

The Evolver 500 Series dual purge has true dual purge capability. This means the applicator can continue to spray paint, at voltage, while side "B" or "Paint 2" is being flushed or cleaned. To operate in the dual purge mode, two (2) separate color valve systems must be installed. This applicator should be used with the MCV Dual Purge Color Changer.

When the target part is finished and a color change is desired, voltage does not need to be turned off. When finished spraying with color "A", shut off color "A" (P1. IN/P2.IN). Trigger on the solvent (SOL), and actuate the applicator. This will clean the coiled fluid tube and applicator spray head, by pushing the remaining paint out the front of the applicator. Next, load color "B" (P1.IN/P2.IN) and begin spraying with color "B". While continuing to spray color "B", open the dump line corresponding to the line color "A" that is in (DL1/DL2) to flush color "A" through the dump line.

When the cleaning cycle with solvent is complete, an air purge for several seconds is recommended to clean and dry the ID of the dump line hose.

Paint Viscosity

The applicator is capable of atomizing paint of most any desired viscosity, however, it is recommended to keep the material viscosity as low as possible. This allows spraying at lower fan and atomization air pressures which result in less overspray and higher transfer efficiency.

⚠ WARNING

➤ Most paints and solvents, including those listed in “Polar and Non-Polar Solvents Chart” in the “Maintenance” section, are toxic to a certain degree and flammable or combustible. Use them only in a well ventilated atmosphere. Use protective equipment as required in the Material Safety Data Sheet supplied with the substance.

Fluid Flow Rate and Pressure

Fluid flow is adjusted through the robot PLC by varying the pilot pressure to an exterior fluid regulator. Fluid pressures from the circulating system may exceed the maximum fluid pressure rating of the Evolver 500 Series dual purge applicator. Because of these high fluid pressures, a manual step-down fluid regulator must be used.

Applicator Trigger Control Air

The Evolver 500 Series dual purge applicators require a minimum of 70 psig (4.8 bar) trigger control air pressure to ensure proper operation of the applicator piston.

Electrostatic Voltage

Under no load conditions, the maximum voltage limit for these spray applicators is 100kV. Some painting operations may require different voltage settings to obtain optimum transfer efficiencies. If Faraday cage areas are predominant on the item being painted, a lower voltage setting would aid in coating these areas.
When not spraying, it is recommended to set back voltage to 30-40kV or off between target parts.

NOTE

➤ If a 0kV command is sent to the MicroPak 2e, a feedback fault will occur.

Sometimes, depending upon target carrier spacing, higher setback voltages may be required. The ramp-up time for the HP-404 cascade (0-100kV) is approximately 3 seconds.

The MicroPak 2e voltage ramp-down works at a rate of 33kV/sec.

Target Distance

The distance between the applicator tip and the article being painted should be 10-14-inches (254mm-356mm) for a single head applicator and at or near the convergence point for a dual head applicator. Excessive distance causes a waste of coating material and wrap back (paint particles being deposited on the applicator body or the robot arm). At close distances the voltage at the tip of the applicator will be reduced, which decreases the charging effect of the applicator.

⚠ WARNING

➤ If target distance is less than 8-inches (203mm), an arc could occur.

⚠ WARNING

➤ If a bell applicator is being used, and needs to be switched to a spray applicator, the bell applicator must have all voltage, fluids, and air turned off, and the bell cup rpm completely stopped before the change out can occur.

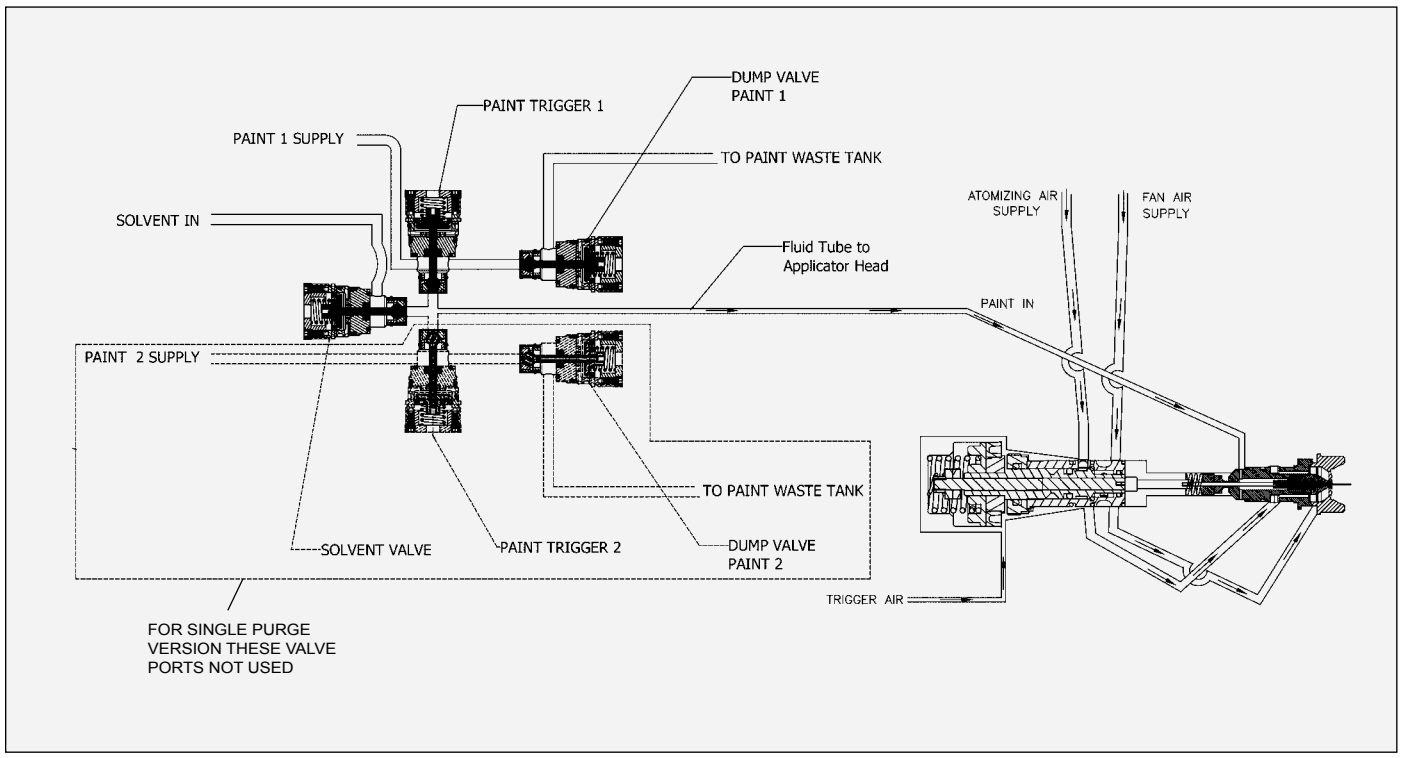


Figure 11: Dual Purge Air And Fluid Passage Schematic

MAINTENANCE

Good maintenance is essential to safe and productive operation. Schedules should be established by the user, based on the following general information and observations of the initial production requirements. The Ransburg maintenance and safety information should be made available to each operator.

Normal fire protection measures are necessary, including proper storage of paints and solvents and the proper disposal of waste. Ready access to appropriate fire extinguishing equipment is required. For details, consult the appropriate NFPA safety information and/or EN 50 176 safety standard.

⚠ WARNING

➤ An electrical discharge or spark may create an electrical and/or fire hazard during maintenance. Do not clean or service the spray applicator with the power supply on. Verify that the power supply has been locked out and tagged out per OSHA and/or your applicable country safety codes.

➤ Unexpected robot movement can be hazardous. Do not adjust or repair the spray applicator when the robot is operating or waiting to start. The robot must be locked out and tagged out per OSHA and/or your applicable country safety codes.

➤ Those solvents used for general cleaning must have a flash point at minimum of 15°C (27°F) greater than the ambient temperature. It is the end user's responsibility to insure this condition is met.

➤ Never remove spray applicator head from assembly while under pressure.

ROUTINE MAINTENANCE SCHEDULE

Follow these maintenance steps to extend the life of the spray applicator and ensure efficient operation:

Several Times Daily

1. Before performing the following procedures, turn the MicroPak 2e control unit OFF. Follow "Lockout/Tagout Procedures".
2. Inspect the fluid nozzle, air cap, and electrode wire for paint accumulation. Clean as frequently as necessary. See "Procedures" in the "Maintenance" section.

⚠ WARNING

➤ Take precautions to see that skin is not punctured by sharp electrode.

⚠ CAUTION

➤ Do not bend the applicator electrode while wiping. Never immerse the applicator in solvents. This will cause damage to the electrical components.

Daily (Or at Shift Start)

1. Turn the MicroPak 2e control unit **OFF** and:
   - Check within 20-ft. (6.1 meters) of the point of operation (of the applicator) and remove or ground **ALL** loose or ungrounded containers.
   - Inspect work holders for accumulated coating materials (remove such accumulations if present). Ensure resistance to ground from work holder is less than 1 megohm.
   - Check that the nozzle assembly is clean and undamaged. Ensure air caps are clean and undamaged.
2. Turn the MicroPak 2e control unit **ON**! Energize high voltage.

Shut-Down (Or at Shift End)

1. Turn the MicroPak 2e control unit OFF.
2. Flush the lines and allow the solvent to remain in the lines. See "Procedures" in the "Maintenance" section.
3. Wipe the applicator (including the air cap) and robot wrist with a cloth and a suitable, clean non-polar solvent.

Weekly

1. Check the entire system for damage, leaks, and paint accumulation.
2. Clean the atomizer assembly.
3. Conduct a current output test. See "Procedures" in the "Maintenance" section.

PROCEDURES

Applicator Cleaning/Service

1. Flush the paint supply line and the applicator paint passages using a solvent which is compatible with the material being sprayed. Continue to flush until all traces of paint are gone.
2. Turn off the solvent supply, actuate paint push-out air at color changer, and trigger the applicator and PT. Allow all of the fluid to drain from the spray applicator fluid passages.
3. Clean the exterior surfaces of the spray applicator with a solvent soaked rag. As long as the applicator is intact, a **polar** solvent may be used for all cleaning, however, after cleaning, wipe off all surfaces with a **non-polar** solvent to reduce conductive residue on the applicator's surface. (See "**Polar & Non-Polar Solvents Chart**" in the "Maintenance" section regarding proper solvent selection.)

POLAR AND NON-POLAR SOLVENTS		
Non-Conductive (Non-Polar)	**Moderately Conductive**	**Extremely Conductive (Polar)**
Amyl Acetate	Methyl Isobutyl Ketone	Methanol
Methyl Amyl Acetate	Ethyl Acetate	Carbitol
Toluene	Methyl Ethyl Ketone	Diacetone
Xylene	Butyl Carbitol	Butyl Alcohol
High Flash Naptha		Acetone
Mineral Spirits		Butyl Cellosolve

⚠ CAUTION

➤ Failure to use a non-polar solvent may cause a decrease in voltage at the tip of the applicator. This will significantly decrease transfer efficiency.

4. Remove end cap [24]. Removing the end cap releases tension on all internal spray head components. Remove needle spring [26] and valve spring [25], which are loose after removing the end cap.

5. Remove the retaining ring [22] and air cap [20]. Soak in a non-polar solvent if necessary. If paint remains in the air cap holes, clean with a toothpick or similar soft wood object. Air caps are best cleaned in an ultrasonic cleaner.

⚠ CAUTION

➤ Never attempt to clean the air cap holes with a wire or other metal object. Doing so may damage the air cap, resulting in distortion of the spray pattern.

6. Remove the double baffle indexer [21] and fluid tip [6]. Clean using a non-polar solvent.

7. Tightly grip the plastic needle [2] and unscrew counter-clockwise to remove the front electrode needle assembly. A short piece of H-2339 tubing (1/4" OD x 0.175" ID) pressed over the front needle will assist in unscrewing the assembly. If required, use needle nose pliers with the jaws covered with masking tape or duct tape. Carefully clean with a non-polar solvent. Replace any parts that show signs of wear or damage.

⚠ CAUTION

➤ If using needle nose pliers to unscrew the front needle, be very careful. Do not grip on the tapered sealing surface. If the pliers slip, they could damage the tapered sealing surface of the needle.

8. Remove fluid nozzle [4] by unscrewing counter-clockwise. Inspect o-ring [5] and all passages for build up or damage. Clean or replace as necessary. Lubricate and reinsert o-ring into applicator barrel and reinstall fluid nozzle. Torque fluid nozzle to 25 lbs•in (2.82 Nm).

NOTE

➤ There should be a small gap between the fluid nozzle and the applicator barrel after tightening.

9. After cleaning, insert the electrode assembly [1] back into the spray head assembly. Apply 7969-05 #222 Loctite Thread-Locker (Purple), to the threads of the electrode assembly before reassembly.

10. Screw fluid tip [6] back into place. Hand tighten first, then with a small wrench, tighten an additional 30 degrees.

NOTE

➤ The fluid tip [6] should always be installed and tightened before installing the needle and valve springs.

⚠ CAUTION

➤ After tightening the fluid tip, verify that the gap between the piston nut and jam nuts are 1/16" (1.54mm) and under. Refer to Figure 13.

11. Replace double baffle indexer [21], air cap [20], and retaining ring [22].

12. Apply a thin film of petroleum jelly to valve and needle springs [25] and [26]. Install the springs back into the end cap and the spray head assembly.

13. Screw end cap [24] back on.

Current Output Test

1. Clean and blow out all fluid passages with non-conductive solvent.

2. Remove the applicator from robot and perform bench test using a spare tubing bundle.

3. Turn the control unit power **ON**.

4. Activate high voltage and slowly approach the applicator electrode with ground hook or wire.

5. Monitor the current output on MicroPak 2e. Current should rise as ground approaches. At approximately 85 microamperes, the MicroPak 2e will shut off. The **OVERCURRENT** indicator should come on.

   The spray head can be removed from assembly as shown in **Figure 13** for cleaning and service.

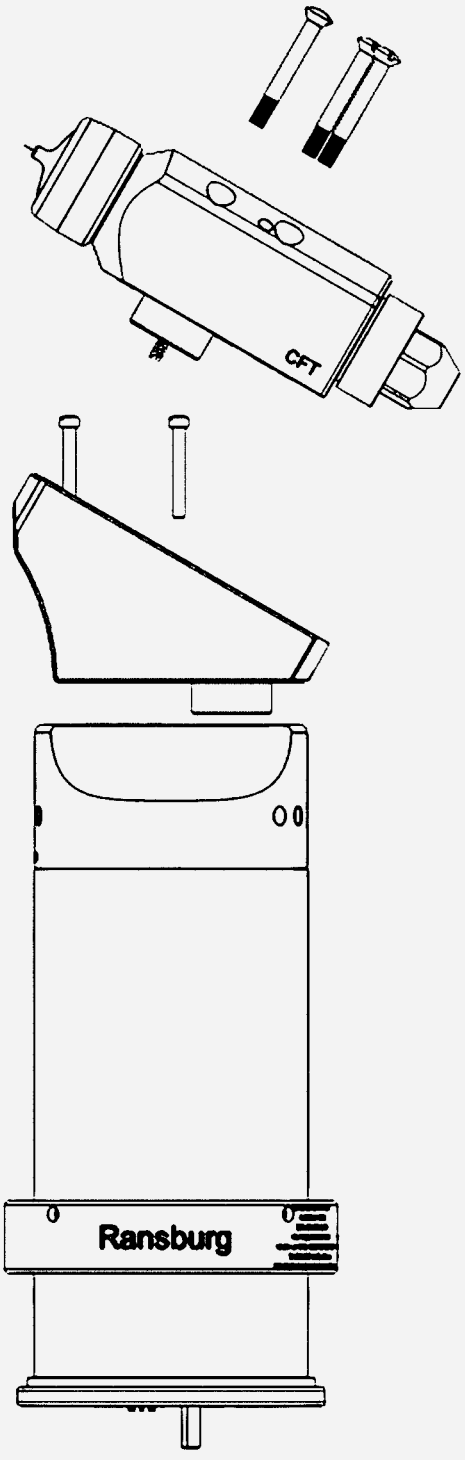


Figure 12: Spray Head Removal

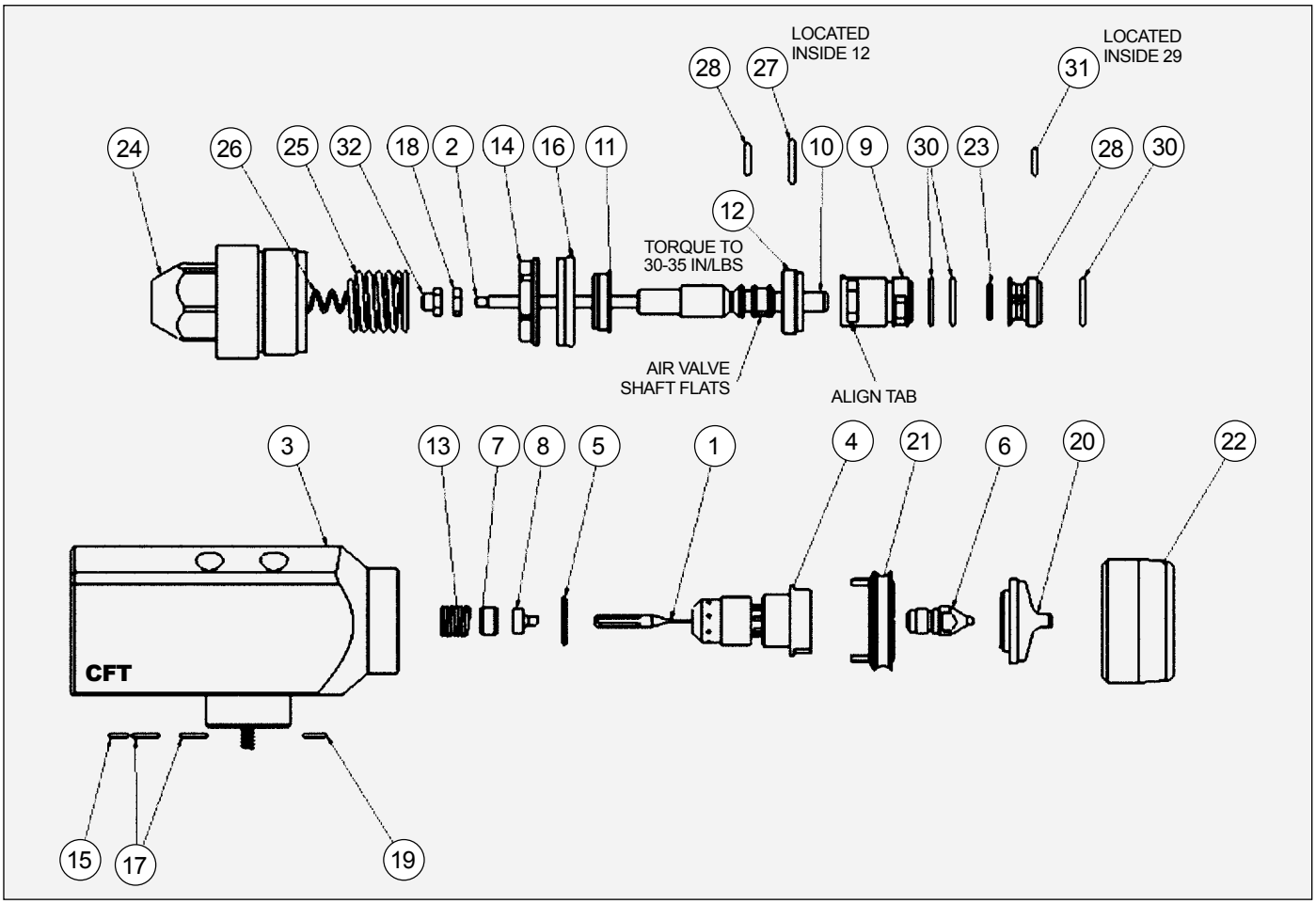


Figure 13: Spray Head Assembly

80432 HEAD SUB ASSEMBLY - PARTS LIST (Figure 13)

Item #	Part #	Description	Qty
1	“A1”	ELECTRODE HIGH WEAR	1
2	79151-00	ASSEMBLY, NEEDLE SHAFT	1
3	80403-01	EVOLVER BARE SPRAY HEAD ASSEMBLY	1
4	“A2”	NOZZLE, FLUID	1
5	79001-01	O-RING .614 ID X .070 CS SOLVENT PROOF	1
6	“A3”	FLUID TIP	1
7	EMF-7	SEAL, WASHER	1
8	RME-32	SEAL	1
9	“A4”	BUSHING, AIR VALVE	1
10	“A5”	SHAFT, VALVE PISTON	1
11	79145-00	PISTON PLATE	1
12	79146-00	SEAL, REAR PISTON	1
13	RME-38	RETURN SPRING, PISTON	1
14	79147-00	PISTON NUT	1
15	79001-04	O-RING, SOLVENT PROOF .176 IS X .07 CS #008	1

(Continued on next page)

80432 HEAD SUB ASSEMBLY - PARTS LIST (Figure 13) (Cont.)

Item #	Part #	Description	Qty
16	7723-06	PISTON, U-CUP	1
17	79001-06	O-RING, KALREZ	2
18	7733-07	NUT, JAM #10-32	1
19	79001-05	O-RING, SOLVENT PROOF .237 IS X .07 CS #010	1
20	“A6”	AIR CAP	1
21	A14277-00	DOUBLE BAFFLE INDEXES	1
22	“A7”	RING, RETAINING	1
23	13076-13	O-RING, TEFLON .566 OD X .426 ID	1
24	79148-00	END CAP, SPRAY HEAD	1
25	9334-00	SPRING, VALVE RETURN	1
26	17615-00	SPRING, COMPRESSION	1
27	79001-29	O-RING, KALREZ, .487 ID X .103 CS	1
28	79001-28	O-RING, KALREZ, .299 ID X .103 CS	1
29	“A8”	CARRIER, SEAL	1
30	79001-01	O-RING, KALREZ, .614 ID X .070 CS	“A9”
31	79001-06	O-RING, KALREZ, .301 ID X .070 CS	1
32	76199-00	NUT, ADJUSTING REAR	1
33	73896-01	CAP PLUG	1

80432-XX MODEL TABULATION

Part #	Description	“A1”	“A2”	“A3”	“A4”	“A5”	“A6”	“A7”	“A8”	“A9”
80432-09	CONVENTIONAL/ NON-BLEED	70430-01	EMF-195	79140-02	79143-00	79144-00	79153-65R-1	79154-00	79172-00	3
80432-10	HVLP/ NON-BLEED	70430-01	79183-00	A14276-00	79143-00	79144-00	79185-48-1	79154-00	79172-00	3
80432-11	CONVENTIONAL-NE/ NON-BLEED	A11218-00	EMF-195	79140-02	79143-00	79144-00	79153-65R-1	79154-00	79172-00	3
80432-12	CONVENTIONAL/ BLEED	70430-01	EMF-195	79140-02	79143-01	79144-01	79153-65R-1	79154-00	79172-01	2
80432-13	HVLP/ BLEED	70430-01	79183-00	A14276-00	79143-01	79144-01	79185-48-1	79154-00	79172-01	2
80432-14	CONVENTIONAL-NE/ BLEED	A11218-00	EMF-195	79140-02	79143-01	79144-01	79153-65R-1	79154-00	79172-01	2
80432-15	TRANS-TECH/ NON-BLEED	70430-01	80198-00	80201-44	79143-00	79144-00	80194-00	80199-00	79172-00	3
80432-16	TRANS-TECH/ NBLEED	70430-01	80198-00	80201-44	79143-01	79144-01	80194-00	80199-00	79172-01	2

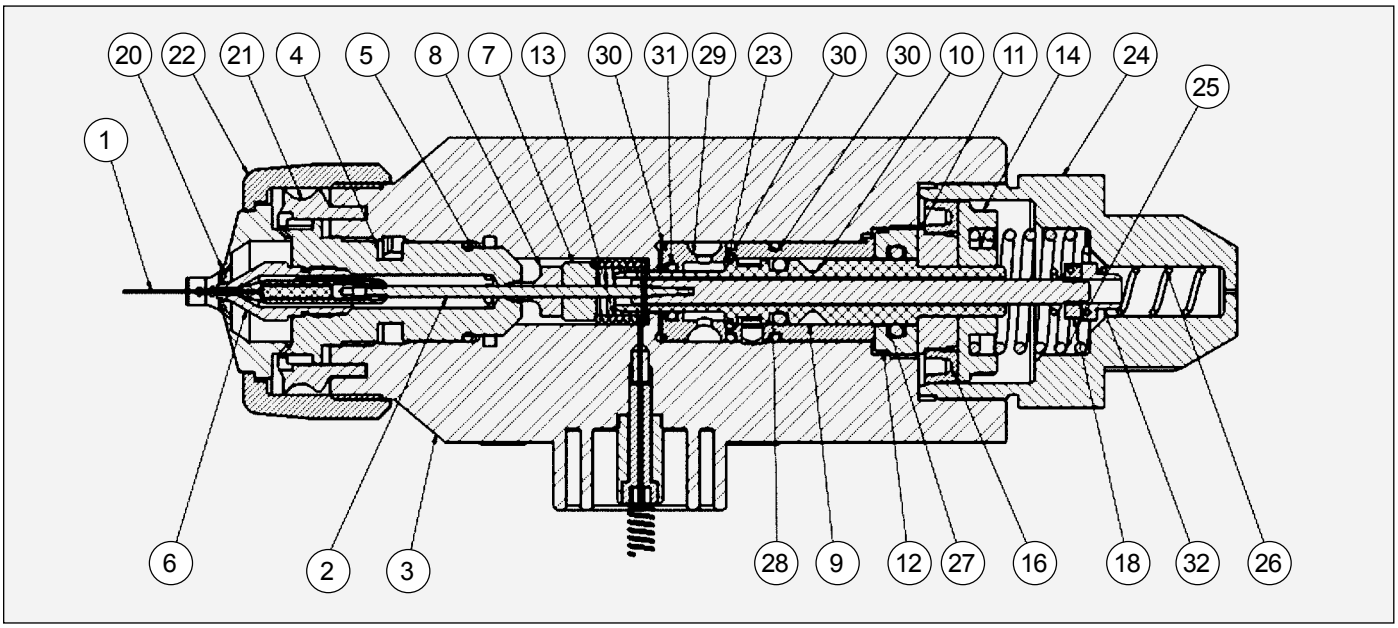


Figure 14: Head Sub-Assembly

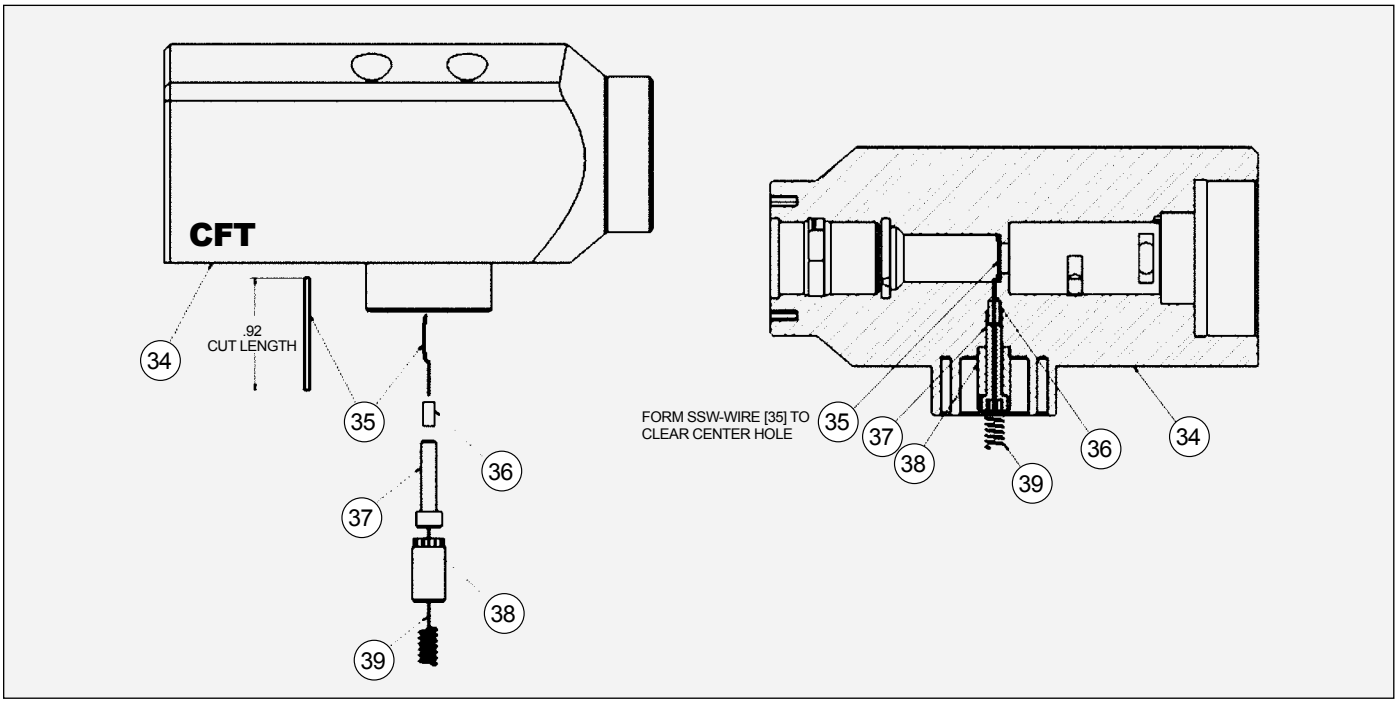


Figure 15: Bare Spray Head Assembly

80403-01 [3] - PARTS LIST

Item #	Part #	Description	Qty
34	80402-01	HEAD, MACHINING	1
35	SSW-1125	SPRING WIRE	1
36	14061-09	SPONGE, CONDUCTIVE	1
37	79142-00	SCREW, MODIFIED #8-32 X 3/4” LONG	1
38	80404-00	PLUG, CONNECTION	1
39	79171-00	SPRING, CONNECTOR	1

NOTE

➤ Ensure that the fan and atomization air are on and flowing prior to triggering the fluid. Ensure that the adjustment of “air before fluid” is correct. Failure to follow this sequence will cause spits and defects on the part being painted.

SERVICE

Because we want to provide our users with the most up-to-date technology possible, we are constantly seeking to improve products. If a change in product configuration occurs after it is on the market, we will implement that technology in future production and, if practical, make it available to current users. The following service information is based on standard specifications and procedures for this product. If you find some minor deviations between this information and your equipment because of design or manufacturing changes, contact your Ransburg representative to resolve the difference.

⚠ WARNING

➤ An electrical discharge or spark may create an electrical and/or fire hazard during maintenance. Do not service the spray applicator with the power supply on. Verify that the power supply on/off switch has been turned off.

➤ Unexpected robot movement can be hazardous. Do not adjust or repair the spray applicator when the robot is operating or waiting to start. The robot must be locked out and tagged out per OSHA prior to removing the applicator from the robot manifold assembly.

Before performing any work on the spray applicator, always flush the fluid passages, blow dry with push out air, and wipe the spray applicator clean. Refer to "Applicator Cleaning" in the "Maintenance" section for instructions on how to properly clean the spray applicator. Depressurize all fluid and air passages before removing the applicator from its manifold. Always work in a clear, clean space to minimize part loss and damage.

⚠ CAUTION

➤ As the spray head is removed from the valve manifold assembly, a certain amount of residual fluid may be present. Care must be taken not to allow this fluid to drain into the high voltage terminal rings or air passages.

⚠ WARNING

➤ Eye protection should be worn while servicing applicator.

SPRAY HEAD ASSEMBLY

NOTE

➤ Disassemble the spray head only enough to remove and replace defective parts. For instance, if only replacing the front electrode it is only necessary to remove the fluid tip; it is not necessary to remove the fluid nozzle.

NOTE

➤ At assembly, apply a small amount of dielectric grease to circular grooved labyrinth in spray head and valve manifold to reduce high voltage breakdown. Excessive grease in the circular grooved labyrinth will not allow spray head to seat fully against mounting block assembly.

➤ To prevent damage, always lubricate the o-rings located on the underside of the spray head.

Rear Needle Replacement (See Figures 14 and 15)

1. Remove the air cap, fluid tip, and the fluid nozzle as described in steps 1 through 8 in "Procedures - Applicator Cleaning / Service" in the "Maintenance" section.

2. Remove the rear needle [2] and lock nuts [18] and [32] as an assembly. Pull the assembly out from the rear of the spray head.

⚠ CAUTION

➤ Fluid seal [8], seal washer [7], and seal spring [13] will come free at this point. Place hand over front end to prevent dropping parts.

3. Inspect the metal portion of the rear needle [2] for excessive wear. If wear is observed (longitudinal grooves or a noticeable reduction in diameter) replace the needle. Remove the two (2) lock nuts from the rear needle and save. When ever replacing rear needle section, you must also replace the seal [8] at the same time.

4. Place the rear needle assembly back into the spray head.

5. Place seal spring [13] over the rear needle in the front end of the spray head. Hold the spray head upward as the spring will want to fall out.

6. Still holding the spray head upward, place the seal washer [7] and thread the fluid seal [8] onto the rear needle. The tapered end of the fluid seal should be pointed toward the front of the applicator.

7. Insert the lubricated o-ring [5] into the applicator head. Gently push, with a small flat object, down upon its seating edge. Be careful not to push o-rings into fluid groove.

8. Reassemble fluid nozzle [4] by pushing the nozzle into the spray head and through the o-ring until the threads engage. Screw the nozzle into the spray head. Torque to 23-25 lbs•in (2.6-2.8 Nm). Plastic threads damage easily; do not over-tighten. Note the front flange of the fluid nozzle will not seat flush against the spray head.

9. Apply 7965-05 #222 Loctite thread-locker (Purple) into the threads of plastic front needle [1] before assembling onto the rear needle. Be sure that the rear needle assembly is pushed all the way forward before threading on front needle.

10. Reassemble fluid tip [6]. Hand tighten first; then with a small wrench turn an additional 30°.

11. Reinstall the two (2) lock nuts [18] and [32] in the correct order on the back needle as shown making sure to maintain an 1/16" clearance.

12. Reassemble air cap [20] and retaining ring [24]. The air cap rotate positioning pins must be engaged with the air cap locator holes before final tightening.

NOTE

➤ When installing the air cap, apply pressure to the Double Baffle Indexer. If the indexer is loose in this process, the air flow will be compromised.

13. Apply a thin film of petroleum jelly to valve spring [25] and needle spring [26], and insert back into the end cap. Screw end cap [24] back on.

14. Lubricate all of the o-rings on the underside of the spray head with petroleum jelly, and apply a thin coat of dielectric grease to the grooves of the spray head and the valve manifold before reassembly.

NOTE

➤ Ensure that the fan and atomization air are on and flowing prior to triggering the fluid. Ensure air before fluid adjustment is correct. Failure to follow this sequence will cause spits and defects on the part being painted.

15. Re-attach spray head to manifold block by aligning the connection plug into the mounting block cavity, and secure with four bolts as shown in **Figure 16**.

Air Valve Removal From Head Assembly (See Figures 14 and 15)

1. After removal of end cap and spring, the air valve [10] can be pulled straight out the back of the head assembly.

2. Inspect and replace the u-cup [16], if necessary, by holding the air valve shaft [10] on it's flats and loosening the piston nut [18] counter-clockwise.

3. Remove the seal carrier [29] with seal removal tool [B].

4. Use a bent hook to reach inside the air valve bushing [9], grip slot and pull out. Use the same procedure to pull out the rear seal carrier [29].

⚠ CAUTION

➤ Use Caution as **NOT TO** scratch or raise burrs on inside diameters of the parts.

5. Remove and replace all o-rings if necessary.

6. O-rings [28] and [31] must be installed inside their mating parts **(Figure 13)**.

7. The o-ring [23] should be inserted into the front of the bushing [9] and one of the o-rings [30] installed onto the outside groove before the bushing is installed.

8. Reassemble the remaining parts as shown in Figure 14 making sure that the alignment tab on the bushing [9] lines up with the align groove in the body [3].

9. Torque the seal carriage [12] to 30-35 lbs•in (4.0-4.5 Nm).

10. If the u-cup needs to be replaced, assemble on piston plate [11] and push both onto shaft, tighten securely with piston nut [14] and install in body as one assembly.

11. Assemble the remainder of the applicator head as stated earlier.

12. If the locking tab plug connection [38] needs to be replaced, first remove the electrode spring connector [39] by pulling straight out with a needle nose pliers. If removed, the spring wire should be replaced.

13. Remove socket head screw [37] and connection plug [38] from body.

14. Replace conductive compressible contact [36] if necessary.

15. Reinstall the connection plug [38] into the body, making sure the tabs on the bottom align with the notches in the body.

16. Insert and tighten the screw [37], making sure the tabs remain inside the notches [38] in the body.

17. Insert the electrode made of wire in the form of a spring [23] through the hole in the screw using a needle nose pliers on the straight wire portion. Carefully rotate and push the wire through the screw hole and into the compressible contact until the spring contacts the screw head.

HEAD SUB-ASSEMBLY INSTRUCTIONS

(See Figures 14 and 15)

1. Cut SSW-1125 to 0.920 inch

2. Insert wire into hole at center of baffle on bottom of gun head

3. Using a needle-nosed pliers or similar, form the wire to the inside wall of the head, making sure it clears the center hole.

4. Assemble conductive foam 14061-09 into cavity.

5. Assemble connection plug (9) into spray head and fasten securely with screw (10)

6. Feed Spring connector into hole in screw until fully inserted.

7. Using needle-nosed pliers or similar, bend the wire to the left to keep it from the center hole.

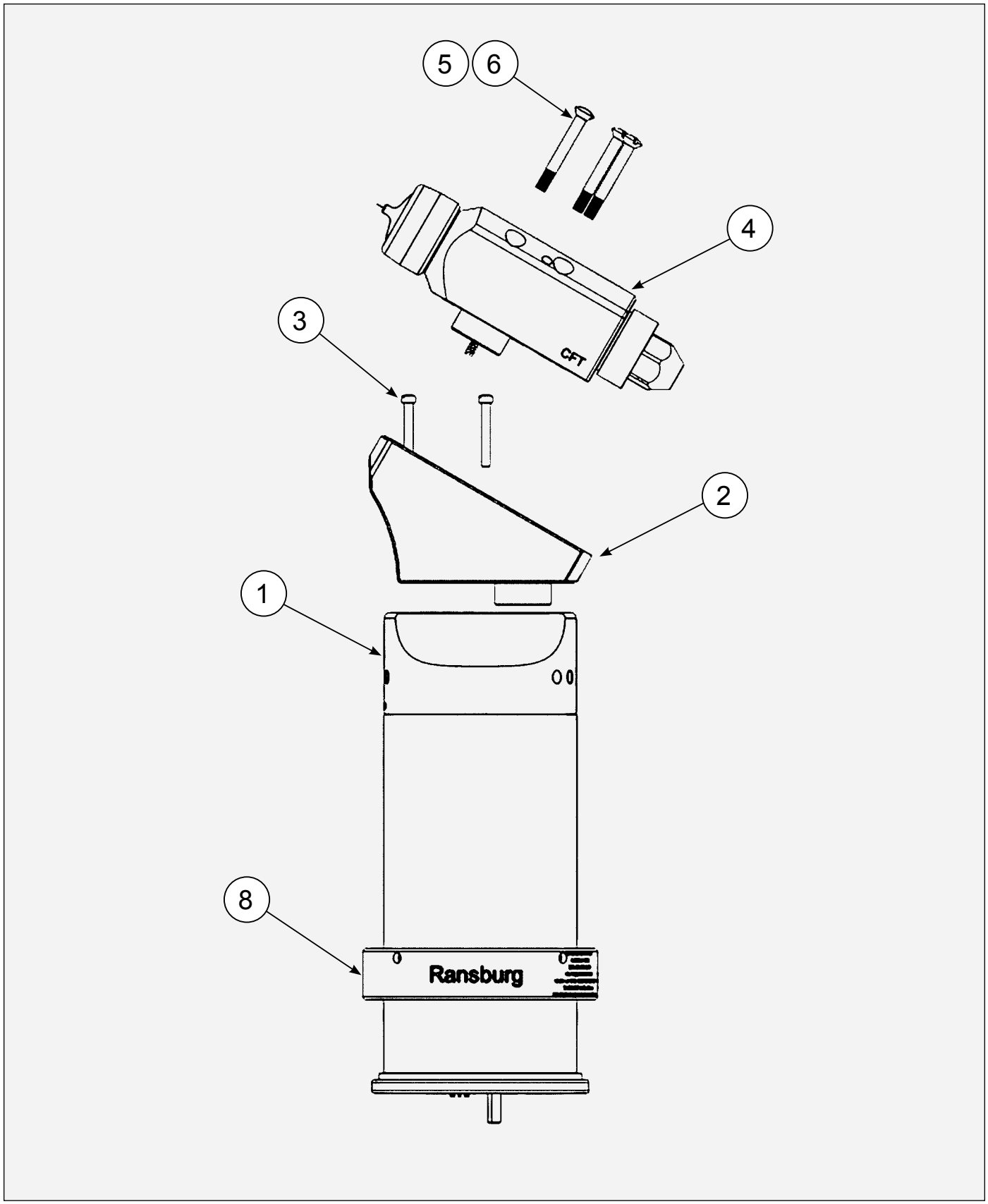


Figure 16: Evolver 500 Series Dual Purge 60° Single Head Applicator Assembly

A13758 SPRAY APPLICATOR ASSEMBLY - PARTS LIST (Figure 16)

Item #	Part #	Description	Qty
1	Table B “A”	Manifold Assembly, Evolver 500 Series Dual Purge	1
2	Table A “B”	Mounting BlockAssembly	1
3	Table A “D”	Screw, Fillister Head Machine, #10-32 X 1.5 Long	Table A “P”
4	Table C “F”	Head Assembly	Table A “C”
5	A14556-00	Screw, 82° Oval Head, 1/4-20	Table A “E”
6	A14374-00	Screw, Fillister Head Machine, #10-32 X 3.25 Long	Table A “M”
7	LSCH0009	Dielectric Grease	4gm tube
8	Table D “R”	Quick Disconnect Ring	1

TABLE A - HEAD CONFIGURATION

Dash No.	Description	"B"	"C"	"D"	"E"	"L"	"M"	"P"
0	60° Single Head	80423-00	1	LSFA0027-00	4	0	0	4
1	90° Single Head	80424-00	1	LSFA0027-00	3	1	1	3
2	60° Dual Head	80425-00	2	79206-00	8	0	0	4
3	90° Dual Head	80426-00	2	79206-00	8	0	0	4

TABLE B - MANIFOLD CONFIGURATION

Dash No.	Description	"A"
00	SINGLE PURGE FOR HIGHLY RESISTIVE MATERIALS, ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-01
01	SINGLE PURGE FOR CONDUCTIVE MATEREIALS, ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-02
02	SINGLE PURGE FOR HIGHLY CONDUCTIVE MATEREIALS, ELECTROSTATIC CASCADE	A13795-03
03	DUAL PURGE FOR HIGHLY RESISTIVE MATERIALS, ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-04
04	DUAL PURGE FOR CONDUCTIVE MATEREIALS, ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-05
05	DUAL PURGE FOR HIGHLY CONDUCTIVE MATEREIALS, ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-06
06	SINGLE PURGE FOR HIGHLY RESISTIVE MATERIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-13
07	SINGLE PURGE FOR CONDUCTIVE MATEREIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-14
08	SINGLE PURGE FOR HIGHLY CONDUCTIVE MATEREIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-15
09	DUAL PURGE FOR HIGHLY RESISTIVE MATERIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-16
10	DUAL PURGE FOR CONDUCTIVE MATEREIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-17
11	DUAL PURGE FOR HIGHLY CONDUCTIVE MATEREIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-18
12	SINGLE PURGE FOR HIGHLY RESISTIVE MATERIALS, ELECTROSTATIC CASCADE-SPLIT SHROUD	A13795-19
13	SINGLE PURGE FOR CONDUCTIVE MATEREIALS, ELECTROSTATIC CASCADE-SPLIT SHROUD	A13795-20
14	SINGLE PURGE FOR HIGHLY CONDUCTIVE MATEREIALS, ELECTROSTATIC CASCADE-SPLIT SHROUD	A13795-21
15	DUAL PURGE FOR HIGHLY RESISTIVE MATERIALS, ELECTROSTATIC CASCADE-SPLIT SHROUD	A13795-22
16	DUAL PURGE FOR CONDUCTIVE MATEREIALS, ELECTROSTATIC CASCADE-SPLIT SHROUD	A13795-23
17	DUAL PURGE FOR HIGHLY CONDUCTIVE MATEREIALS, ELECTROSTATIC CASCADE-SPLIT SHROUD	A13795-24
18	SINGLE PURGE FOR HIGHLY RESISTIVE MATERIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-25
19	SINGLE PURGE FOR CONDUCTIVE MATEREIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-26
20	SINGLE PURGE FOR HIGHLY CONDUCTIVE MATEREIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-27
21	DUAL PURGE FOR HIGHLY RESISTIVE MATERIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-28
22	DUAL PURGE FOR CONDUCTIVE MATEREIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-30
23	DUAL PURGE FOR HIGHLY CONDUCTIVE MATEREIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-31

GUN HEAD IDENTIFICATION

All gun heads are designed to be used with any atomization technology available for the Evolver, Conventional, HVLP, or Trans-Tech.

Removing Spray Applicator From The Rear Manifold Assembly

Anytime service is required within the applicator shroud, the applicator should be removed from the robot mounting plate assembly. After the applicator is removed from the robot, always move to a clear, clean work area to remove the applicator shroud and begin servicing.

1. Purge all fluid from the system and blow lines dry with push out air before the applicator is removed.

2. All pressures must be removed, both air and fluid, before removing the applicator. Fluid pressure can be removed by actuating the applicator trigger with the fluid regulator open.

3. Turn off the power supply to the applicator.

4. Remove applicator from robot by turning the retaining ring counter-clockwise from the robot mounting plate.

5. Remove spray head as previously described in **Figure 15**.

Spray Applicator Disassembly (See Figures 13, 14, and 15)

6. Remove the four (4) screws [5] from mounting block [2] and pull the block out of the upper manifold.

7. Remove and inspect the o-rings on the upper manifold. Replace if necessary.

8. Remove mounting ring by pulling straight up.

9. Remove the five (5) screws from the bottom of the mounting plate.

10. Remove the break-away ring from the mounting plate.

11. Pull down on the shroud and slip it off the applicator assembly to reveal the internal assembly components. It may be necessary to carefully use a flat head screwdriver between the shroud and the upper manifold to pry the two apart.

12. Remove the five (5) air bolts from the bottom of the mounting plate. Inspect the five (5) o-rings located within the air bolts and replace if necessary.

13. Remove the coil fluid tube by unscrewing the fluid fitting from the valve manifold block.

14. Remove the cascade plug from the mounting plate by unscrewing the set screw located on the side of the mounting plate in-line with the timer markings. (For set screw location see **Figure 14**).

15. Slide the valve manifold block and mounting plate off of the support rods.

16. Unscrew the five (5) support rods from the upper manifold using an A11284-00 tool.

17. Remove the cascade from the upper manifold by pulling straight down on the cascade.

18. Remove the coil fluid tube from the upper manifold by unscrewing the fluid fitting.

19. Remove the mounting plate from the valve manifold block by unscrewing the three (3) screws located on the bottom of the mounting plate.

20. Reassemble in reverse order making sure to align the cascade wire plug timing mark with the timing mark on the mounting plate. Remember to tighten the set screw called out in **Figure 14**.

21. When placing the shroud back onto the assembly, make sure to mate the edge on the shroud with the upper manifold, and fit the lip of the shroud into the groove on the upper manifold.

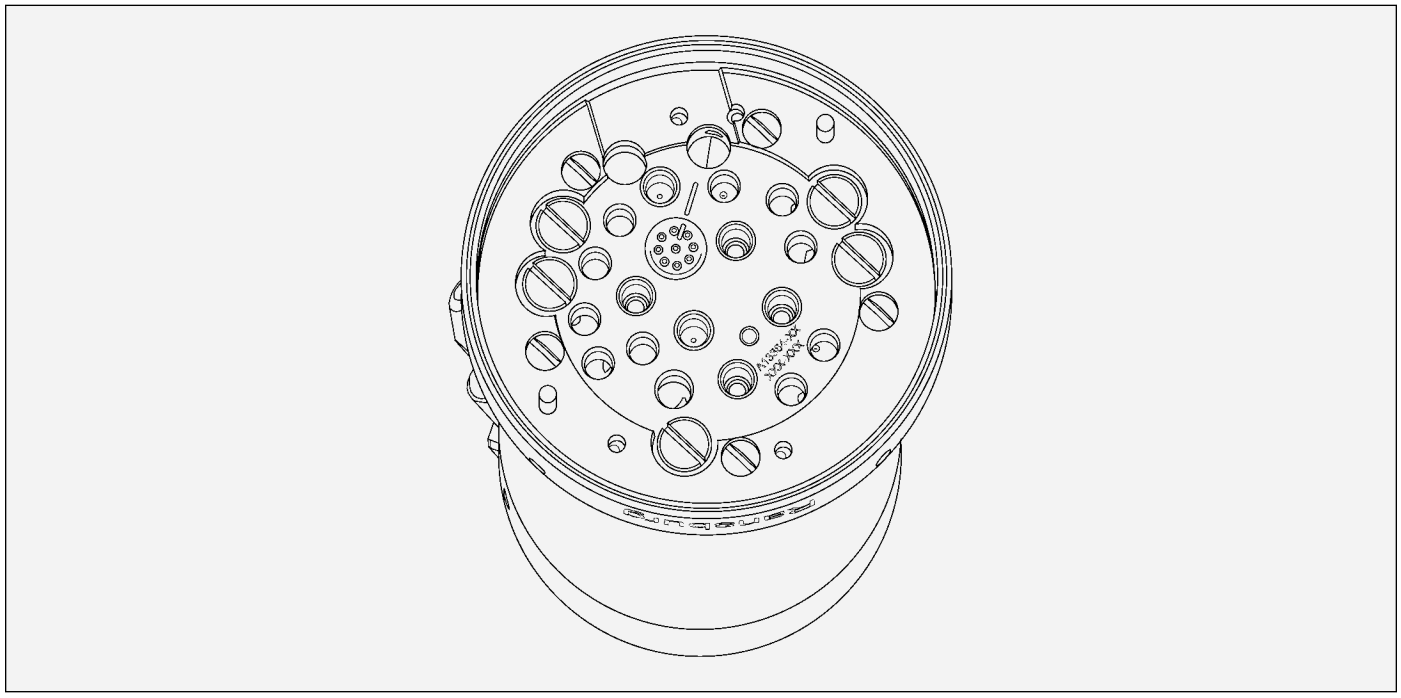


Figure 17: LV Cable Connector - Alignment with Match Mark

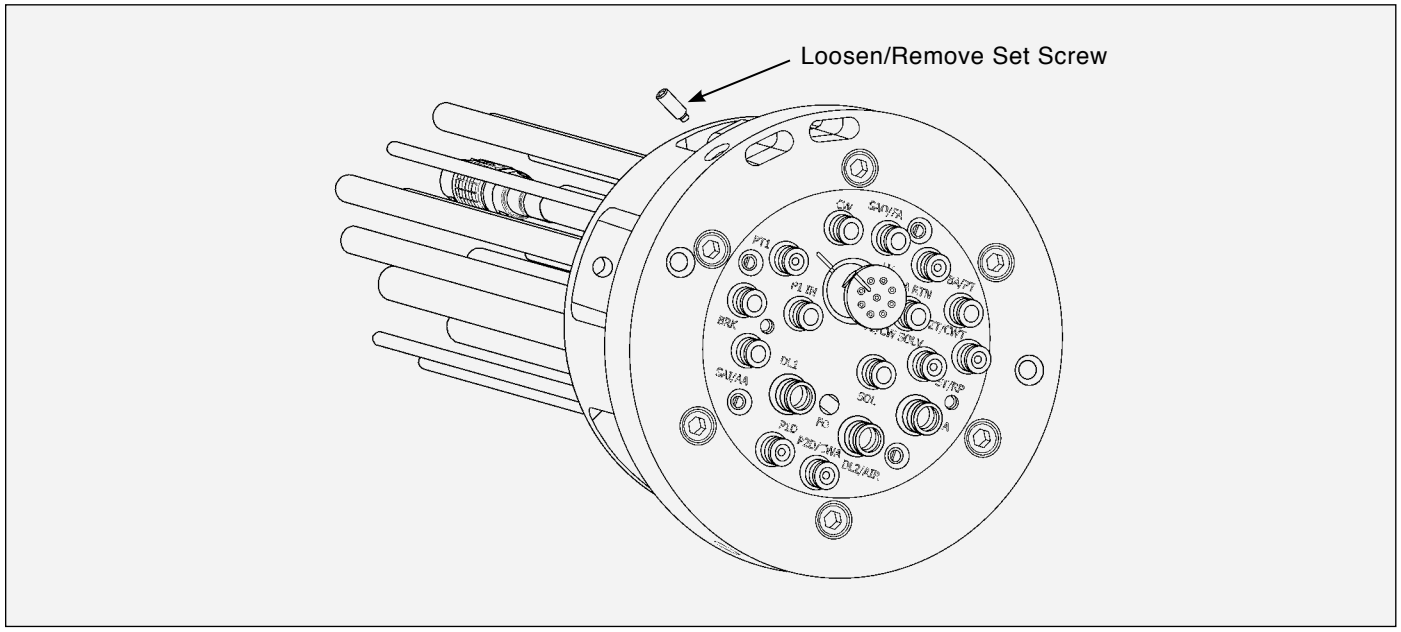


Figure 18: Low Voltage Cable Removal

LOW VOLTAGE CABLE REMOVAL - PARTS LIST (Figure 18)

Item	Qty	Part #	Description
1	1	A12284-00	Assembly, Robot Mounting Plate
2	2	SSF-2052	Set Screw, 3/8" Lg. X #10-24
3	1	A12239-00	Assembly, Cable Low Voltage

Cascade Removal / Replacement

Removal

Remove all components, shroud, break-away ring, rear plate, and rear manifold. (See “Rear Plate/Rear Manifold/ Cascade Removal Replacement” in the “Maintenance” section.) Pull the cascade straight out of the knuckle.

Replacement

Use a small amount of dielectric grease (LSCH0009) on the end of the spring of the cascade and the wire in the knuckle. Also apply a small amount of grease into the concentric rings around the spring.

Install the cascade with the potted side of the cascade towards the outside of the applicator. Make sure o-ring is in the groove inside the knuckle labyrinth area.

Low Voltage Cable Removal (Refer to Figure 18)

1. Disconnect low voltage cable [3] from rear of power supply. For A13613-XXXXXXXXXX power supply, disconnect circular connector from receptacle on rear of power supply.

2. Loosen retaining ring and remove applicator from robot wrist.

3. Using 3/16" (4.8mm) Hex Key wrench, remove set screw [2] **(see Figure 18)**.

4. Remove the low voltage cable by pulling through the robot arm and mounting plate.

5. To reinstall, insert power supply end of cable through mounting plate, pull through robot arm and connect to junction box or power supply. For connections to power supply, plug connector into receptacle (A13613-XXXXXXXXXX power supply).

6. Align the timing mark of the connector on the applicator end of the cable with the mark on the mounting plate and tighten set screw.

Valve and Seat Inspection

Inspect the valves and seats for any build-up of materials. Valves should be cleaned with an appropriate cleaning solvent to remove the material on it.

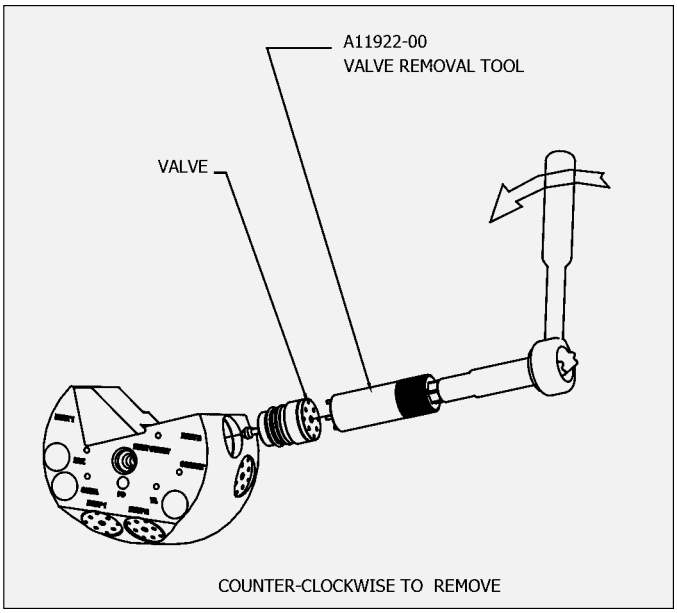


Figure 19: Valve Removal

Using the seat removal tool (A10756-00), insert the smaller hex end into the block to engage the seat female hex. Using a 3/8" (10mm) socket end-wrench, or adjustable wrench, remove the seat by turning counter-clockwise, as shown in **Figure 20**.

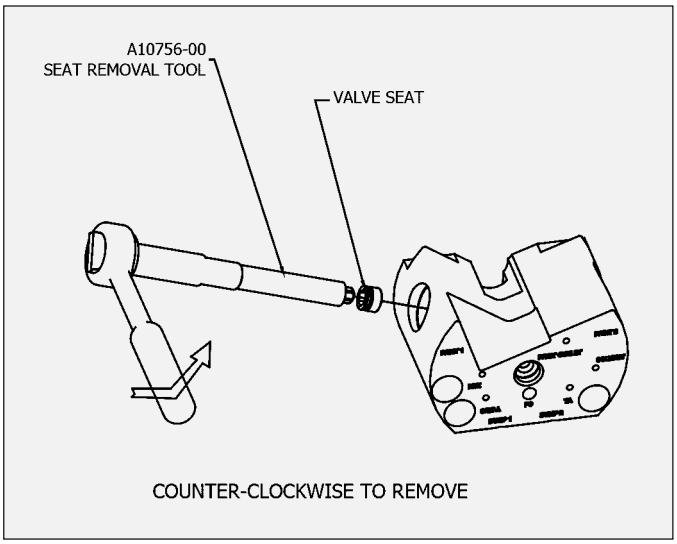


Figure 20: Seat Removal

NOTE

➤ A seat should not be replaced unless there are indications of valve leakage in operation.

Replacement

Lubricate the seat o-ring using a suitable lubricant such as Amojell petroleum jelly, A11545. By hand, using the seat tool (A10756-00), carefully start threading the seat into the pocket for the seat.

NOTE

➤ Carefully start the seat into the pocket. It may be easily cross threaded.

Hand tighten the seat in place. Using a torque wrench with a 3/8" (10mm) socket, torque the valve seats to 15-20 lbs•in (1.7-2.3 Nm)

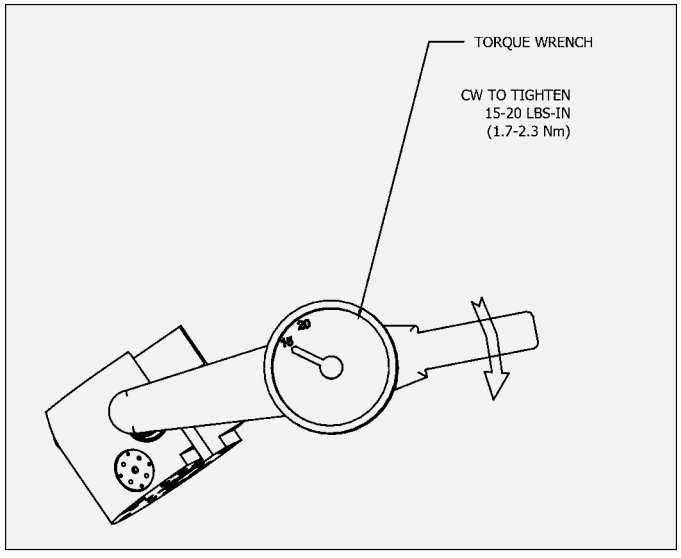


Figure 21: Valve Seat Torque

⚠ CAUTION

➤ Always use a torque wrench to torque the seats in place. Over-torquing the seats may cause permanent irreparable damage to the rear manifold.

Lubricate the valve o-rings with a suitable o-ring lubricant such as Amojell petroleum jelly, A11545. By hand, start the threads of the valve into the pocket. Tighten using a 1/2" (13mm) socket and torque to 15-20 lbs•in (1.7-2.3 Nm).

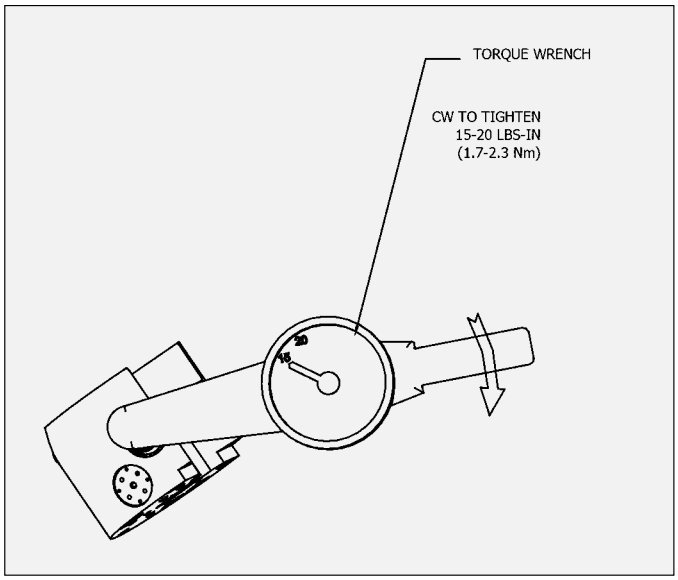


Figure 22: Valve Torque

VALVE MANIFOLD ASSEMBLY
(SINGLE PURGE / INTEGRATED CUP WASH VALVES)

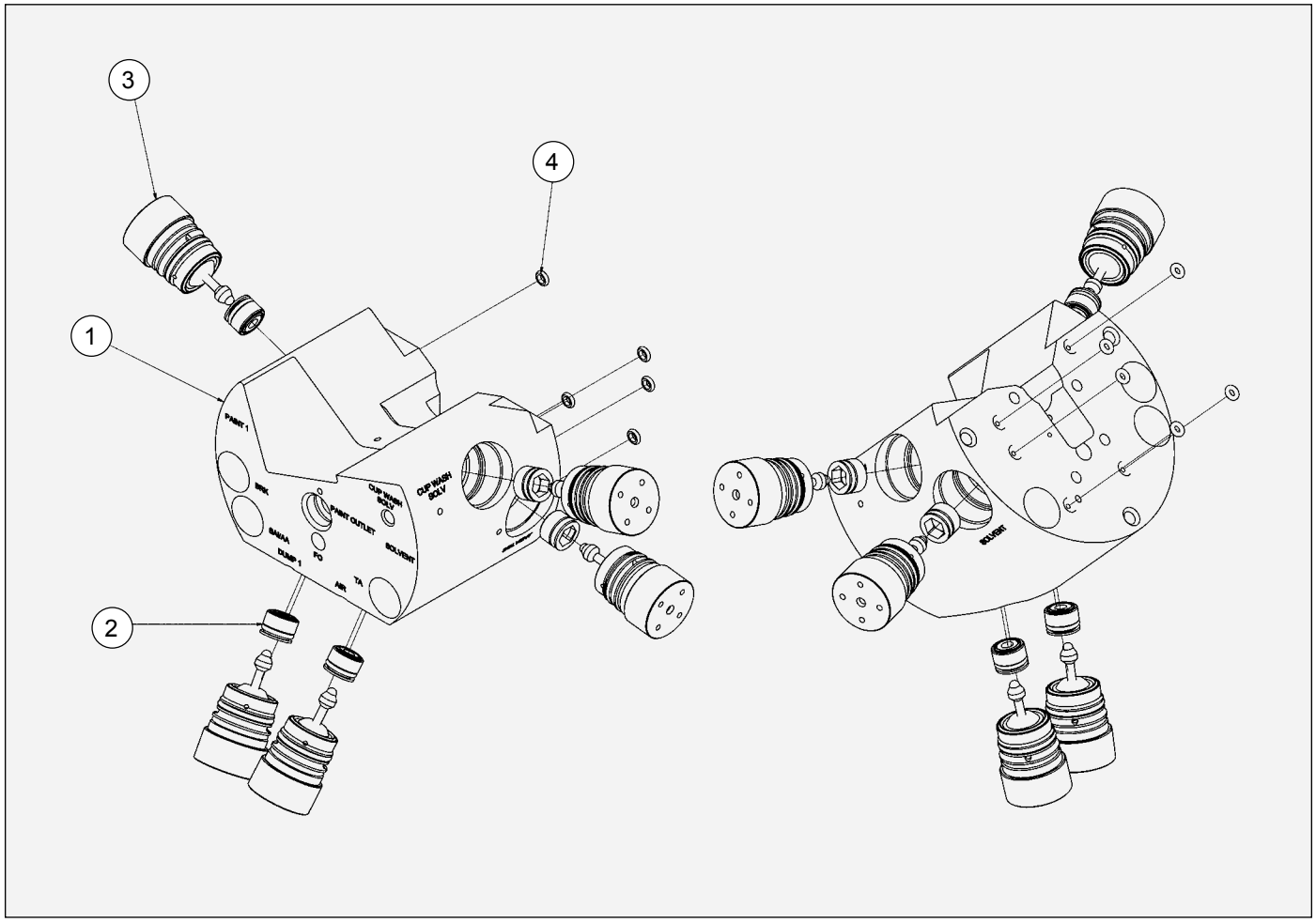


Figure 23: Single Purge Valve Manifold Assembly

A13729-02 VALVE MANIFOLD ASSEMBLY - PARTS LIST			
Item	**Qty**	**Part #**	**Description**
1	1	A13728-00	VALVE MANIFOLD (SINGLE PURGE)
2	5	77367-00	VALVE SEAT ASSEMBLY
3	5	78949-00	VALVE ASSEMBLY
4	5	79001-38	O-RING, SOLVENT PROOF
5	1	A13732-00	CUP WASH PLUG

1. APPLY A LIGHT COATING OF A11545 AMOJELL TO ALL O-RINGS PRIOR TO ASSEMBLING

3 TORQUE TO 15-20 LBS/IN (1.69-2.26 Nm) AFTER VALVE IS DOWN

2 TORQUE TO 15-20 LBS/IN (1.69-2.26 Nm)

VALVE MANIFOLD ASSEMBLY (DUAL PURGE)

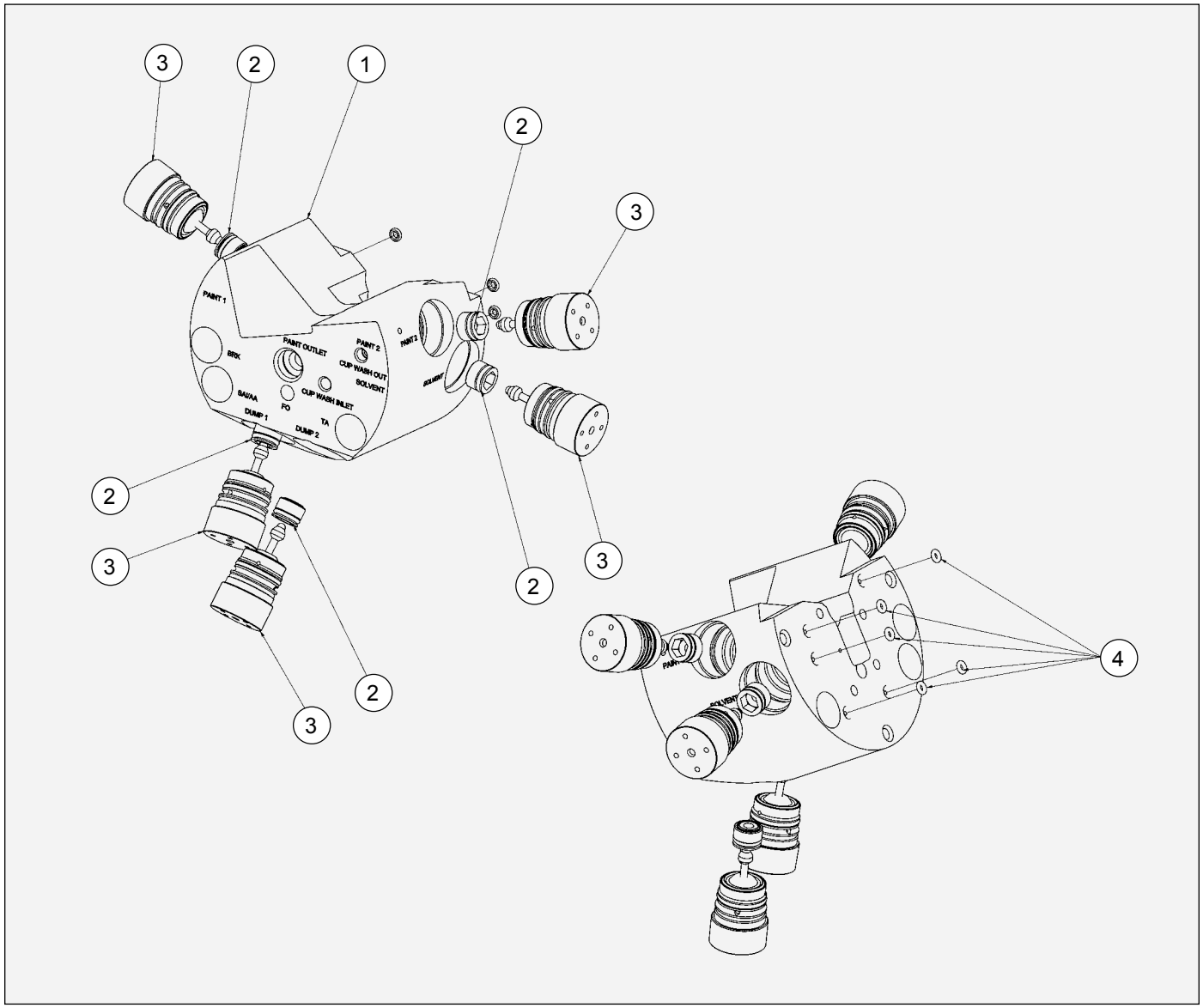


Figure 24: Dual Purge Valve Manifold Assembly

A13540-02 VALVE MANIFOLD ASSEMBLY - PARTS LIST

Item	Qty	Part #	Description
1	1	A13539-00	VALVE MANIFOLD (SINGLE PURGE)
2	5	77367-00	VALVE SEAT ASSEMBLY
3	5	78949-00	VALVE ASSEMBLY
4	5	79001-38	O-RING, SOLVENT PROOF
5	1	A13732-00	CUP WASH PLUG

1. APPLY A LIGHT COATING OF A11545 AMOJELL TO ALL O-RINGS PRIOR TO ASSEMBLING

3 TORQUE TO 15-20 LBS/IN (1.69-2.26 Nm) AFTER VALVE IS DOWN

2 TORQUE TO 15-20 LBS/IN (1.69-2.26 Nm)

TROUBLESHOOTING GUIDE

General Problem	Possible Cause	Solution
Fluid Does Not Turn On	Trigger pilot regulator has not been set to a minimum of 70 psig (4.8 bar)	Increase to 70 psig (4.8 bar) minimum.
	The green air tube possibly left disconnected during reassembly	Reconnect tubing.
	Green tube leading from the source to the applicator mounting plate is pinched or broken	Check the tubing for kinks or damage. Replace if worn or damaged.
	Piston seal within the applicator spray head is not in place or there is an extremely tight fit between the seal and the cylinder wall	a. Make sure that the seal is in the proper position and/or lubricate with a small amount of petroleum jelly. b. O-rings left out of small Ø tie rods. c. O-ring missing between mounting block and upper manifold. d. O-ring missing between mounting block and replaceable head.
	PT is not actuated	Make sure PT is activated. Both PT and BA/PT (paint trigger) must be activated to trigger the applicator on.
	Paint trigger (BA/PT) not actuated	Make sure paint trigger (BA/PT) is actuated. Both PT and BA/PT must be actuated to trigger the applicator on.
No Fan or Atomization Air Pressure At the Air Cap	Low trigger pilot air pressure (70 psi (4.8 bar) min. required)	Increase pressure.
	Air tubes 79134-00 are not installed properly.	Reinstall and tighten as required.
	Blue or gray 3/8" (10mm) OD tube is cut or pinched	Examine, repair as required.
Excessive Current or Loss of High Voltage	Metallic particle alignment in coiled tube	Start fluid flow before turning voltage on.
	Fluid leaks inside	Repair/replace fittings and/or coiled fluid tube as required.
	Fluid coil pin-holed	Replace coil as required.
	Exterior of applicator contaminated	Clean with non-polar solvent.

(Continued On Next Page)

TROUBLESHOOTING GUIDE (Cont.)

General Problem	Possible Cause	Solution
No Electrostatics	Cascade not functioning	a. Check low voltage cable and applicator wiring harness timing mark positions. Correct as required. b. Cascade bad. Replace as required. c. Low voltage cable connections wrong at MicroPak 2e. d. Low voltage cable bad. Replace as required.
Low kV, High µA Output	Exterior of applicator contaminated with conductive material	a. Replace applicator cover. b. Clean exterior with a non-polar solvent.
Low kV, Low µA Output	Cascade failure	Replace as required.
No Fluid Flow	Fluid valve does not actuate	a. Verify that air pilot signal is present. b. Fluid valve air pilot pressure is too low. Increase air pressure to 70 psig minimum. c. Replace fluid valve.
	Clogged fluid tube	Remove and inspect fluid tube.
	Bad transceiver module	Replace transceiver module.
	Plugged inlet	Flush clean.
	Regulator (needle and seat) stuck	Remove and clean or replace.
	No pilot air	Check air pilot.
	Two component valve contaminated	Remove valve manifold and clean.
	In-line mix tube clogged	Replace.
Continuous Fluid Flow	Fluid valve open	a. Remove air pilot signal. b. If still open, replace fluid valve.
	Fluid valve seat damaged or worn	Replace fluid valve seat.
	Regulator (needle and seat) dirty	Remove and clean or replace.
	Regulator pilot air not shut off	Check air supply.

(Continued On Next Page)

TROUBLESHOOTING GUIDE (Cont.)

General Problem	Possible Cause	Solution
Uncontrollable Fluid Flow	Insufficient back pressure to fluid regulator	Replace fluid tube with the next smaller inner diameter size.
	Fluid regulator does not control flow (system)	Disassemble fluid regulator and inspect for failed components (system).
	Diaphragm stretched from excessive air pressure	Rebuild regulator.
	Ruptured diaphragm	Rebuild regulator.
	Inconsistent pilot air supply	Check air source.
Paint Sputtering	Ruptured Diaphragm	Replace regulator diaphragm.
Fluid Leakage Around Fluid Valve	Damaged o-ring(s) on outer diameter of valve body	Replace o-ring.
	Damaged or worn needle seals inside valve assembly	Inspect tubing coil for scratches and replace if damaged.
Paint Leakage (Regulator)	Diaphragm (screws) loose	Replace o-ring(s).
	Ruptured diaphragm	Replace valve assembly.
Low or No High Voltage	High current draw	a. Paint resistivity to be .1MΩ to ∞. b. Replace coiled fluid line.
	Loss of low voltage cable connection between robot and mounting plates.	Remove applicator and inspect low voltage connections on both plates. Verify alignment marks between connectors and plates and verify that connector face is flush with plate. Verify that set screws are secure, but not too tight, as this will prevent the spring loaded pins on the robot plate from extending and making contact.
	Improper limiting current and voltage settings.	To readjust settings, refer to "MicroPak 2e" operating manual.
	Applicator grounding out (usually indicated by high current draw or by MicroPak 2e over-current fault light)	a. Clean atomizer externally with non-polar solvent. b. Check the atomizer for internal fluid leaks. c. Check for fluid leaks at quick disconnect mounting (between bell plate and robot plate).

(Continued On Next Page)

TROUBLESHOOTING GUIDE (Cont.)

General Problem	Possible Cause	Solution
Low or No High Voltage (Cont.)	Applicator grounding out (usually indicated by high current draw or by MicroPak 2e over-current fault light)	d. Check for internal arcing (usually indicated by internal sparking sounds). e. Make sure cascade low voltage connection is properly shielded.
	Faulty low voltage connections (usually indicated by MicroPak 2e feedback fault light)	a. Make sure quick disconnection electrical connection is aligned and clean. b. Check low voltage connection at cascade.
	Faulty high voltage connection	Remove cascade and check continuity between cascade connection and turbine shaft.
	MicroPak 2e or cascade failure	Refer to "MicroPak 2e" service manual for detailed "Troubleshooting Guide".
	Improper color change (i.e. paint or solvent in dump line)	Optimize color change.
Low Transfer Efficiency (or light coverage)	Low or no high voltage	Verify high voltage at bell cup edge. Normally, a high voltage setting of 70 -100 kV is appropriate for most applications.
	Poor grounding of parts being coated	Verify that parts being coated are properly grounded (the electrical resistance between the part and ground must not exceed 1 megohm).
	Excessive target distance	The recommended target distance is between 10-14-inches (254mm - 356mm) (see "Target Distance" in the "Operation" section of this manual).
Fluid and/or Air Leakage Between the Robot and Rear Manifold Plates	Applicator mounting nut is loose	Tighten mounting ring.
	O-ring is missing	Install o-ring.
	O-ring is damaged	Visually inspect for damage and replace.

Note: To check for fluid leaks, it is easiest to first remove the applicator from the test station and remove the shroud from the applicator. Then the applicator can be remounted to the test station. Leak detector may be used at all appropriate sources. Be certain to wipe off all residual solution using a non-conductive solvent such as Naphtha.

PARTS IDENTIFICATION

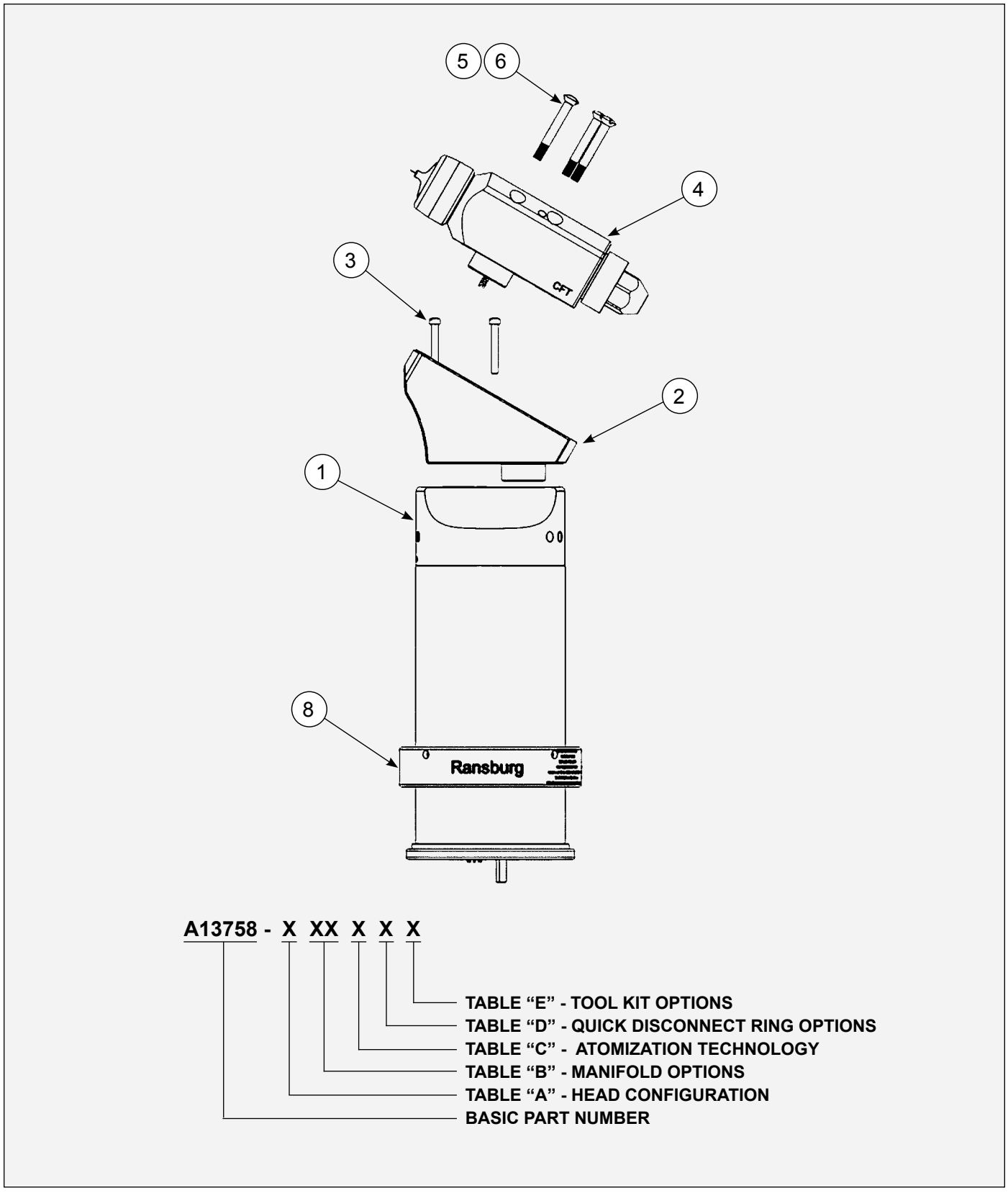


Figure 25: A13758 Spray Applicator Assembly

A13758 SPRAY APPLICATOR ASSEMBLY - PARTS LIST (Figure 25)

Item #	Part #	Description	Qty
1	Table B “A”	Manifold Assembly, Evolver 500 Series Dual Purge	1
2	Table A “B”	Mounting BlockAssembly	1
3	Table A “D”	Screw, Fillister Head Machine, #10-32 X 1.5 Long	Table A “P”
4	Table C “F”	Head Assembly	Table A “C”
5	A14556-00	Screw, 82° Oval Head, 1/4-20	Table A “E”
6	A14374-00	Screw, Fillister Head Machine, #10-32 X 3.25 Long	Table A “M”
7	LSCH0009	Dielectric Grease	4gm tube
8	Table D “R”	Quick Disconnect Ring	1

TABLE A - HEAD CONFIGURATION

Dash No.	Description	"B"	"C"	"D"	"E"	"L"	"M"	"P"
0	60° Single Head	80423-00	1	LSFA0027-00	4	0	0	4
1	90° Single Head	80424-00	1	LSFA0027-00	3	1	1	3
2	60° Dual Head	80425-00	2	79206-00	8	0	0	4
3	90° Dual Head	80426-00	2	79206-00	8	0	0	4

TABLE B - MANIFOLD CONFIGURATION

Dash No.	Description	"A"
00	SINGLE PURGE FOR HIGHLY RESISTIVE MATERIALS, ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-01
01	SINGLE PURGE FOR CONDUCTIVE MATEREIALS, ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-02
02	SINGLE PURGE FOR HIGHLY CONDUCTIVE MATEREIALS, ELECTROSTATIC CASCADE	A13795-03
03	DUAL PURGE FOR HIGHLY RESISTIVE MATERIALS, ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-04
04	DUAL PURGE FOR CONDUCTIVE MATEREIALS, ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-05
05	DUAL PURGE FOR HIGHLY CONDUCTIVE MATEREIALS, ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-06
06	SINGLE PURGE FOR HIGHLY RESISTIVE MATERIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-13
07	SINGLE PURGE FOR CONDUCTIVE MATEREIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-14
08	SINGLE PURGE FOR HIGHLY CONDUCTIVE MATEREIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-15
09	DUAL PURGE FOR HIGHLY RESISTIVE MATERIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-16
10	DUAL PURGE FOR CONDUCTIVE MATEREIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-17
11	DUAL PURGE FOR HIGHLY CONDUCTIVE MATEREIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-18
12	SINGLE PURGE FOR HIGHLY RESISTIVE MATERIALS, ELECTROSTATIC CASCADE-SPLIT SHROUD	A13795-19
13	SINGLE PURGE FOR CONDUCTIVE MATEREIALS, ELECTROSTATIC CASCADE-SPLIT SHROUD	A13795-20
14	SINGLE PURGE FOR HIGHLY CONDUCTIVE MATEREIALS, ELECTROSTATIC CASCADE-SPLIT SHROUD	A13795-21
15	DUAL PURGE FOR HIGHLY RESISTIVE MATERIALS, ELECTROSTATIC CASCADE-SPLIT SHROUD	A13795-22
16	DUAL PURGE FOR CONDUCTIVE MATEREIALS, ELECTROSTATIC CASCADE-SPLIT SHROUD	A13795-23
17	DUAL PURGE FOR HIGHLY CONDUCTIVE MATEREIALS, ELECTROSTATIC CASCADE-SPLIT SHROUD	A13795-24
18	SINGLE PURGE FOR HIGHLY RESISTIVE MATERIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-25
19	SINGLE PURGE FOR CONDUCTIVE MATEREIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-26
20	SINGLE PURGE FOR HIGHLY CONDUCTIVE MATEREIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-27
21	DUAL PURGE FOR HIGHLY RESISTIVE MATERIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-28
22	DUAL PURGE FOR CONDUCTIVE MATEREIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-30
23	DUAL PURGE FOR HIGHLY CONDUCTIVE MATEREIALS, NON-ELECTROSTATIC CASCADE-ROUND SHROUD	A13795-31

TABLE C - GUN HEAD OPTIONS

Dash No.	Description	"F"
0	Conventional Spray/Non-Bleed	80432-09
1	HVLP Spray/Non-Bleed	80432-10
2	Conventional Spray/Bleed	80432-12
3	HVLP Spray/Bleed	80432-13
4	Trans-Tech Non-Bleed	80432-15
5	Trans-Tech Bleed	80432-16

TABLE D - QUICK DISCONNECT RING

Dash #	Description	“R”
0	Stainless Steel Ring	A11201-00
1	Black Plastic Ring	A13455-00
2	Stainless Steel Ring - FM/ATEX	A11201-02
3	Black Plastic Ring - FM/ATEX	A13455-03

TABLE E - TOOL KIT OPTIONS

Dash #	Description	Part #	Qty
0	No Tool Kit	N/A	0
1	Evolver Tool Kit	79203-00	1

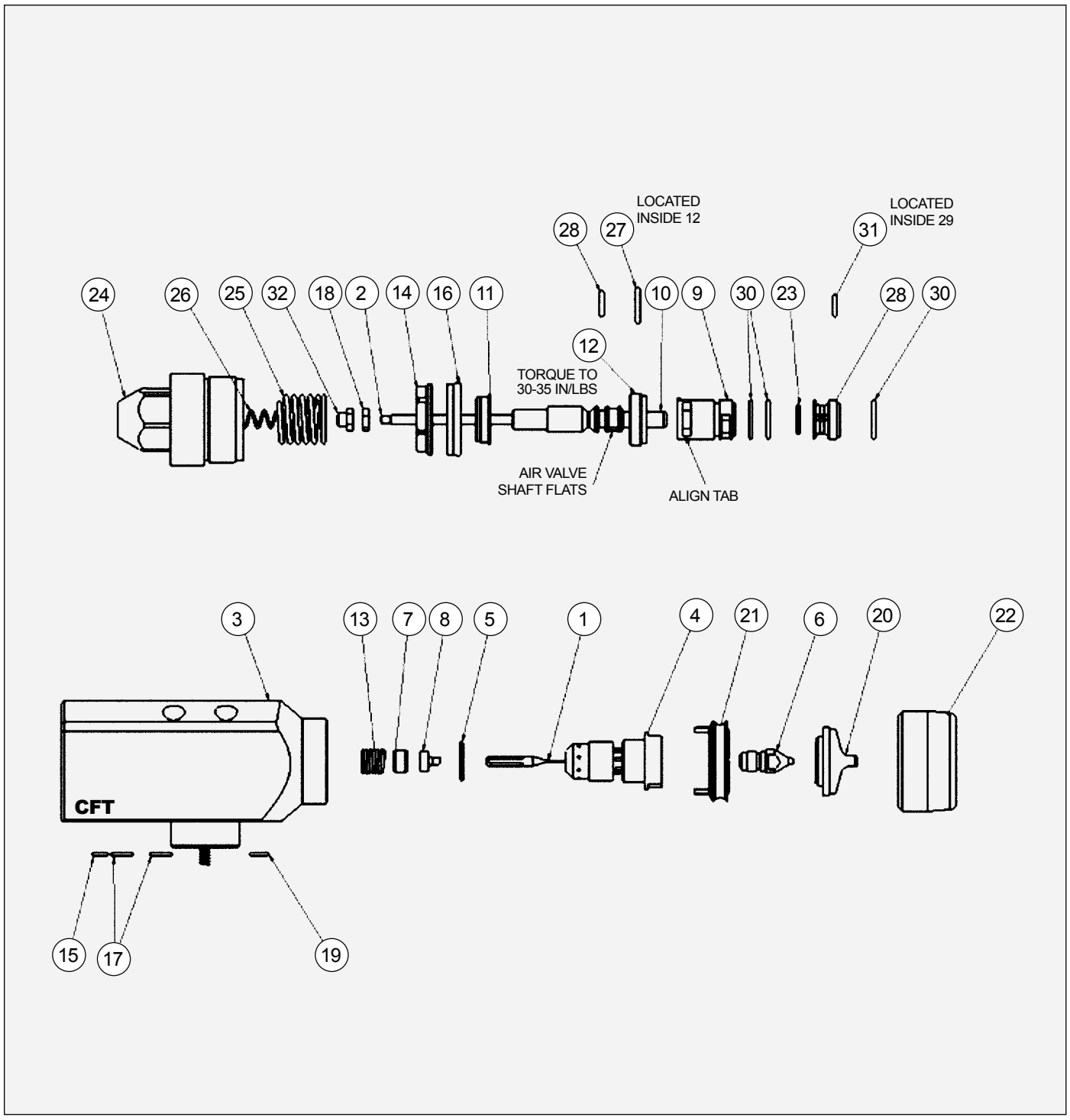


Figure 26: 80432-XX Spray Head Assembly

80432 HEAD SUB ASSEMBLY - PARTS LIST (Figure 26)

Item #	Part #	Description	Qty
1	“A1”	ELECTRODE HIGH WEAR	1
2	79151-00	ASSEMBLY, NEEDLE SHAFT	1
3	80403-01	EVOLVER BARE SPRAY HEAD ASSEMBLY	1
4	“A2”	NOZZLE, FLUID	1
5	79001-01	O-RING .614 ID X .070 CS SOLVENT PROOF	1
6	“A3”	FLUID TIP	1
7	EMF-7	SEAL, WASHER	1
8	RME-32	SEAL	1
9	“A4”	BUSHING, AIR VALVE	1
10	“A5”	SHAFT, VALVE PISTON	1
11	79145-00	PISTON PLATE	1
12	79146-00	SEAL, REAR PISTON	1
13	RME-38	RETURN SPRING, PISTON	1
14	79147-00	PISTON NUT	1
15	79001-04	O-RING, SOLVENT PROOF .176 IS X .07 CS #008	1
16	7723-06	PISTON, U-CUP	1
17	79001-06	O-RING, KALREZ	2
18	7733-07	NUT, JAM #10-32	1
19	79001-05	O-RING, SOLVENT PROOF .237 IS X .07 CS #010	1
20	“A6”	AIR CAP	1
21	A14277-00	DOUBLE BAFFLE INDEXES	1
22	“A7”	RING, RETAINING	1
23	13076-13	O-RING, TEFLON .566 OD X .426 ID	1
24	79148-00	END CAP, SPRAY HEAD	1
25	9334-00	SPRING, VALVE RETURN	1
26	17615-00	SPRING, COMPRESSION	1
27	79001-29	O-RING, KALREZ, .487 ID X .103 CS	1
28	79001-28	O-RING, KALREZ, .299 ID X .103 CS	1
29	“A8”	CARRIER, SEAL	1
30	79001-01	O-RING, KALREZ, .614 ID X .070 CS	“A9”
31	79001-06	O-RING, KALREZ, .301 ID X .070 CS	1
32	76199-00	NUT, ADJUSTING REAR	1
33	73896-01	CAP PLUG	1

80432-XX MODEL TABULATION

Part #	Description	"A1"	"A2"	"A3"	"A4"	"A5"	"A6"	"A7"	"A8"	"A9"
80432-09	CONVENTIONAL / NON-BLEED	70430-01	EMF-195	79140-02	79143-00	79144-00	79153-65R-1	79154-00	79172-00	3
80432-10	HVLP / NON-BLEED	70430-01	79183-00	A14276-00	79143-00	79144-00	79185-48-1	79154-00	79172-00	3
80432-11	CONVENTIONAL-NE / NON-BLEED	A11218-00	EMF-195	79140-02	79143-00	79144-00	79153-65R-1	79154-00	79172-00	3
80432-12	CONVENTIONAL / BLEED	70430-01	EMF-195	79140-02	79143-01	79144-01	79153-65R-1	79154-00	79172-01	2
80432-13	HVLP / BLEED	70430-01	79183-00	A14276-00	79143-01	79144-01	79185-48-1	79154-00	79172-01	2
80432-14	CONVENTIONAL-NE / BLEED	A11218-00	EMF-195	79140-02	79143-01	79144-01	79153-65R-1	79154-00	79172-01	2
80432-15	TRANS-TECH / NON-BLEED	70430-01	80198-00	80201-44	79143-00	79144-00	80194-00	80199-00	79172-00	3
80432-16	TRANS-TECH / NBLEED	70430-01	80198-00	80201-44	79143-01	79144-01	80194-00	80199-00	79172-01	2

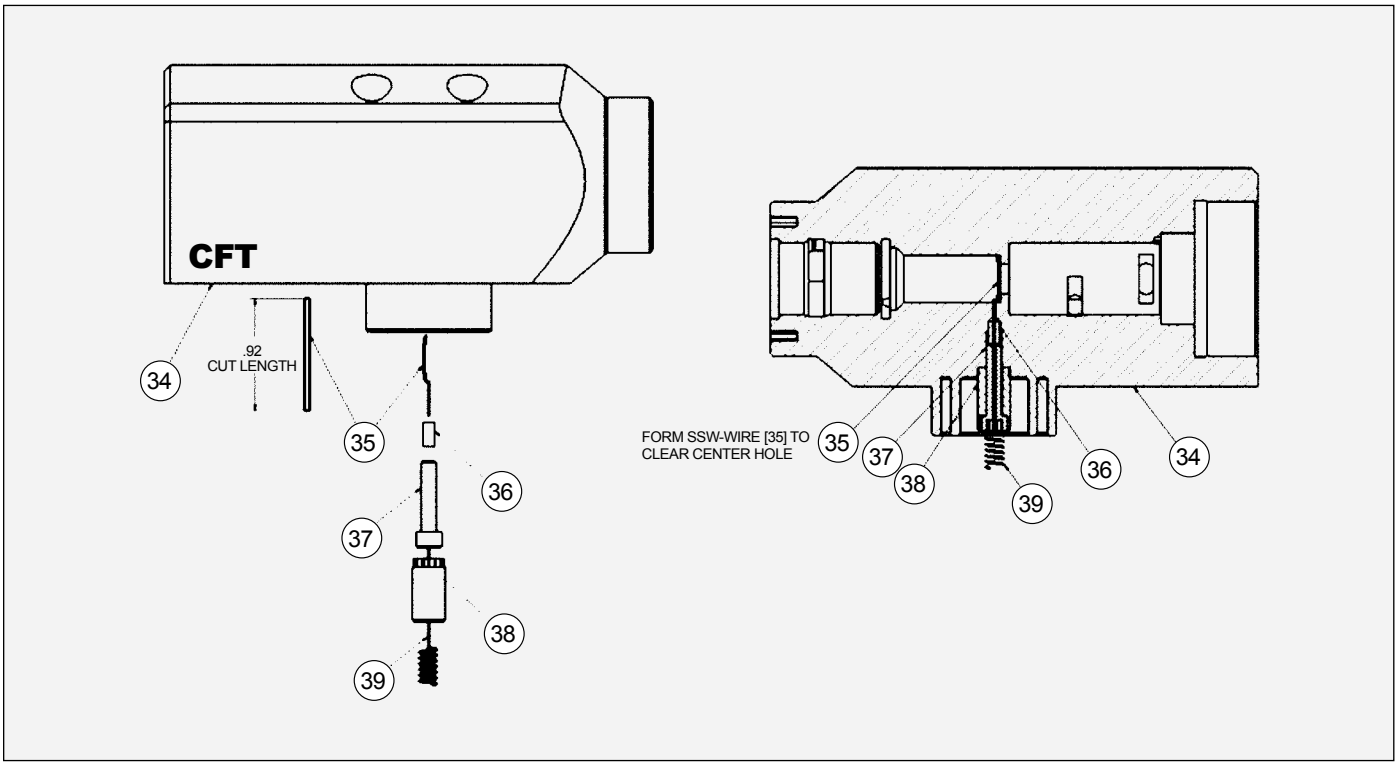


Figure 27: Bare Spray Head Assembly

80403-01 [3] - PARTS LIST (Figure 27)

Item #	Part #	Description	Qty
34	80402-01	HEAD, MACHINING	1
35	SSW-1125	SPRING WIRE	1
36	14061-09	SPONGE, CONDUCTIVE	1
37	79142-00	SCREW, MODIFIED #8-32 X 3/4" LONG	1
38	80404-00	PLUG, CONNECTION	1
39	79171-00	SPRING, CONNECTOR	1

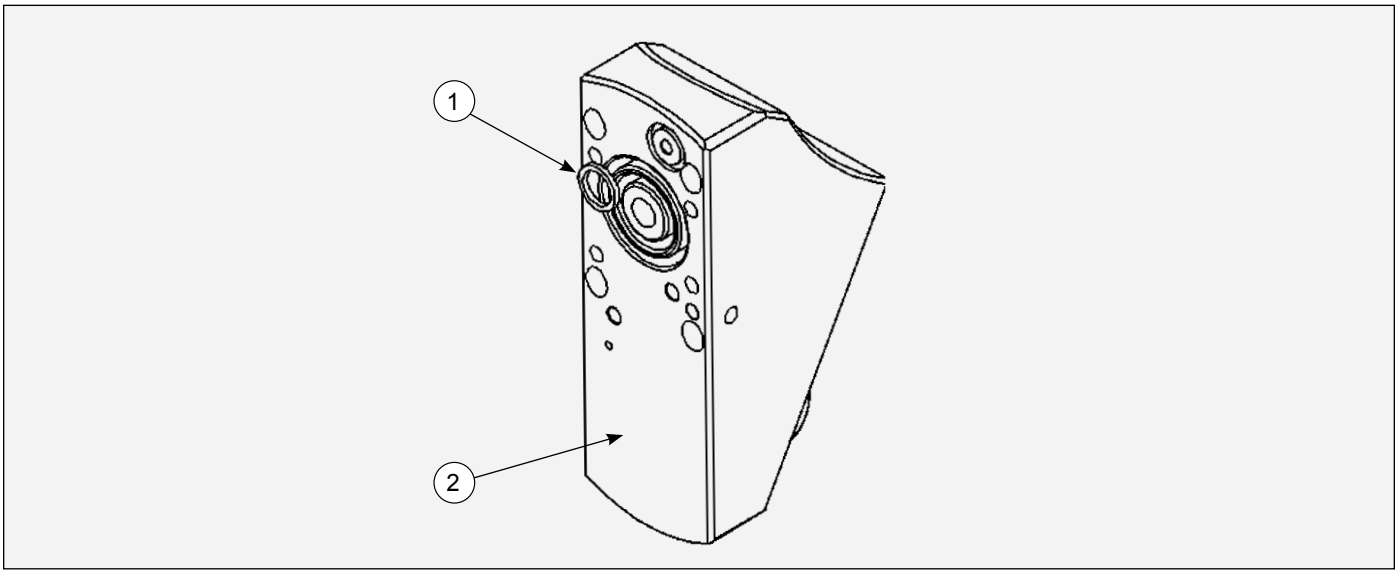


Figure 28: Single Head 60°

80423-00 SINGLE HEAD 60° - PARTS LIST (Figure 28)

Item #	Part #	Description	Qty
1	A10612-00	Square Cut Ring, Solvent Proof	1
2	80427-00	Assembly, Mounting Block 60° Single Head	1

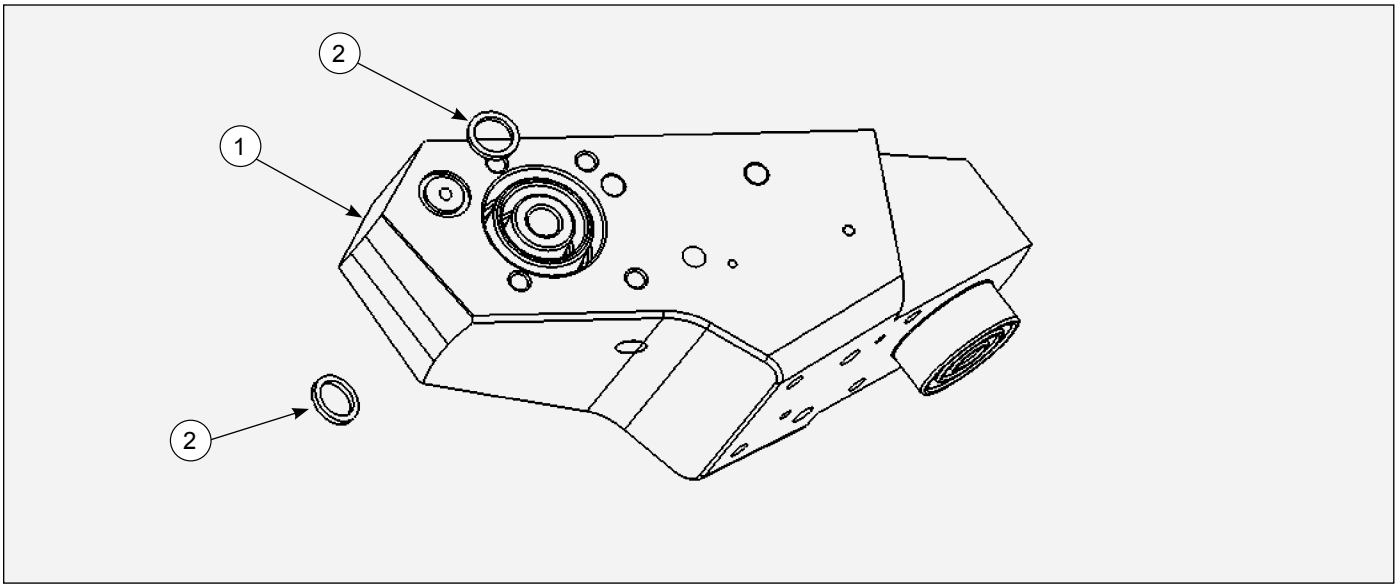


Figure 29: Dual Head 60°

80425-00 DUAL HEAD 60° - PARTS LIST (Figure 29)

Item #	Part #	Description	Qty
1	80429-00	Assembly, Electrode Wire 60° Dual Head Mounting Block	1
2	A10612-00	Square Cut Ring, Solvent Proof	2

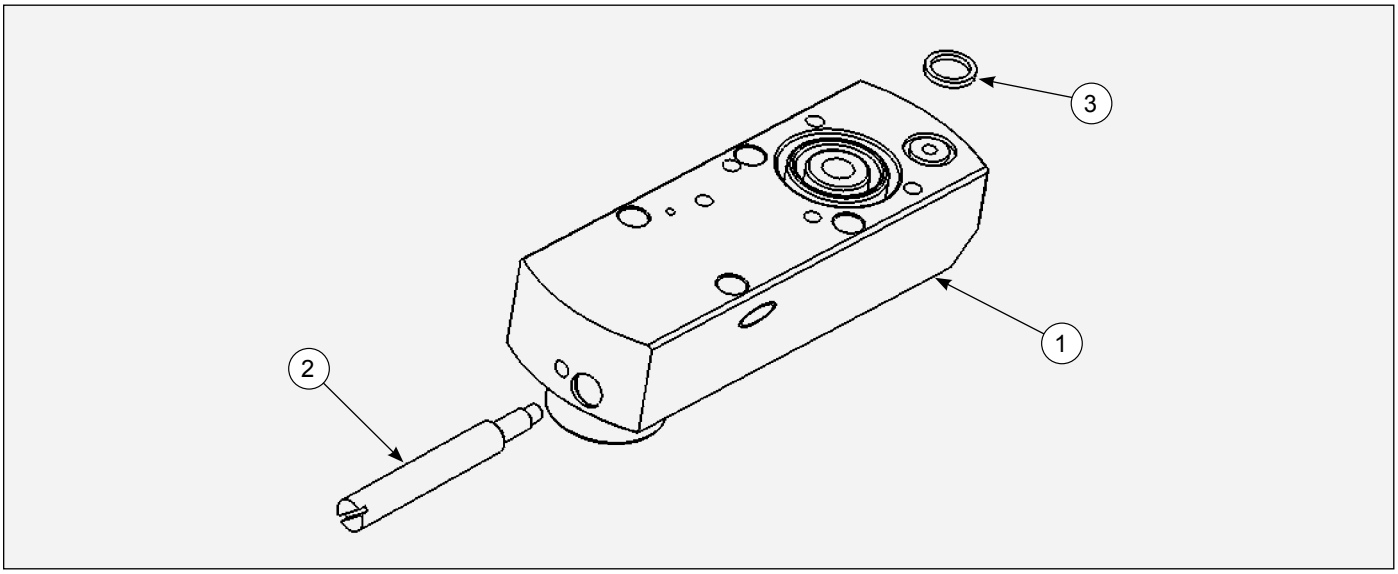


Figure 30: Single Head 90°

80424-00 SINGLE HEAD 90° - PARTS LIST (Figure 30)

Item #	Part #	Description	Qty
1	80428-00	Assembly, Mounting Block 90° Single Head	1
2	79194-01	Fluid Plug	1
3	A10612-00	Square Cut Ring, Solvent Proof	1

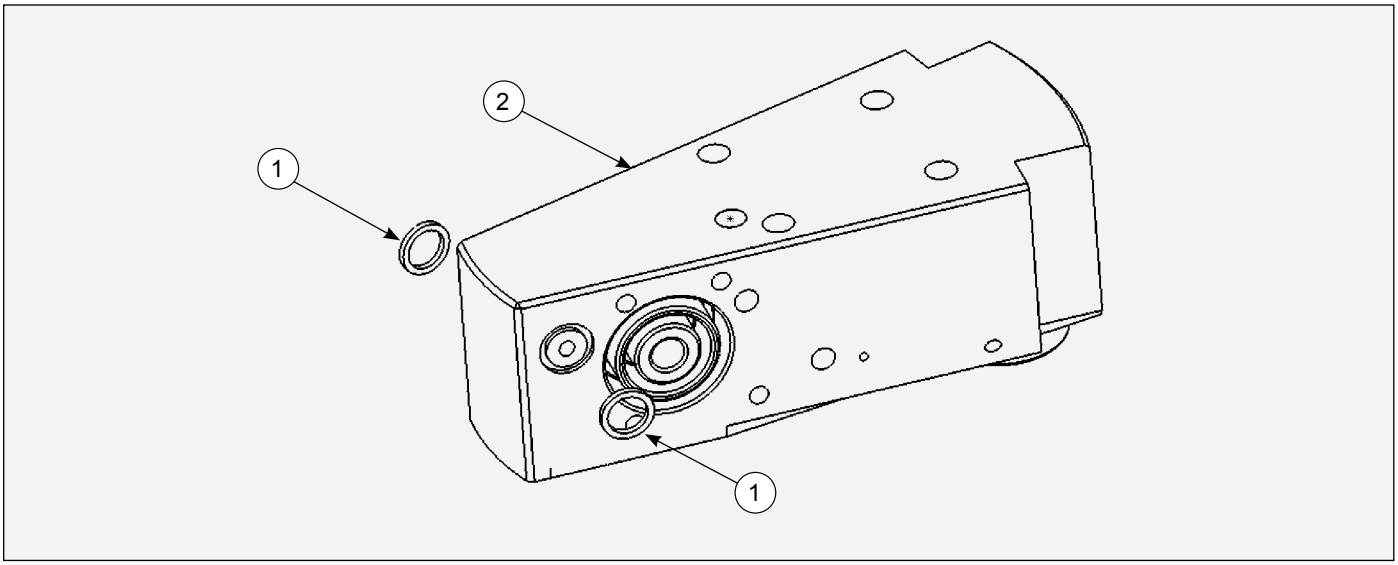


Figure 31: Dual Head 90°

80426-00 DUAL HEAD 90° - PARTS LIST (Figure 29)

Item #	Part #	Description	Qty
1	A10612-00	Square Cut Ring, Solvent Proof	2
2	80431-00	Assembly, Mounting Block 90° Dual Head	1

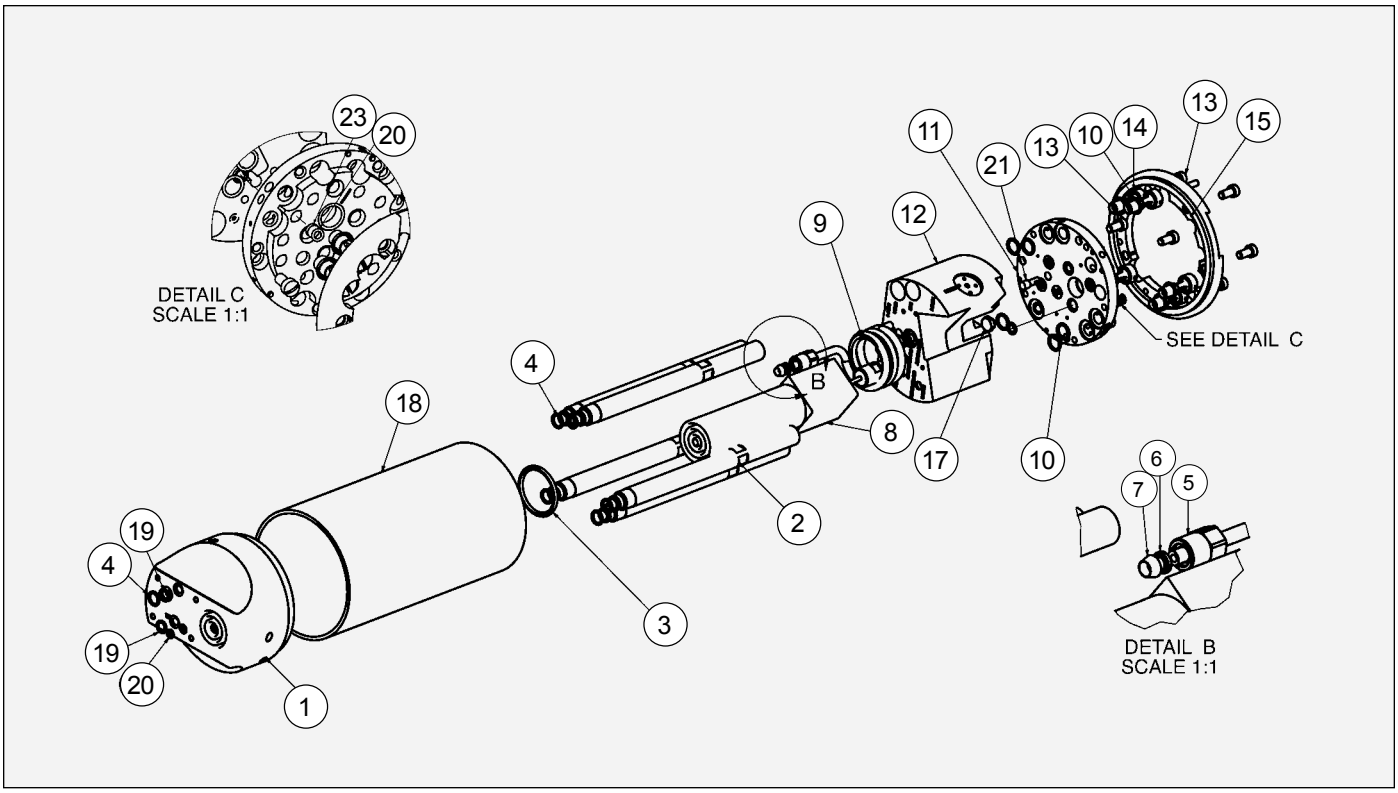


Figure 32: A13795 Manifold Assembly

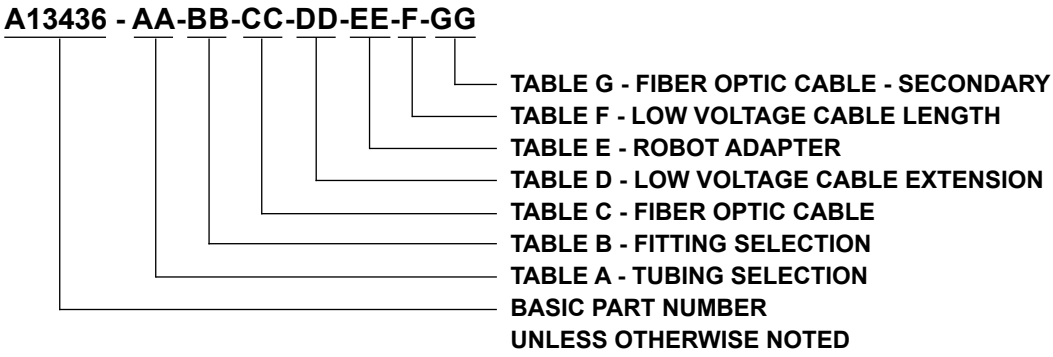
A13795 MANIFOLD ASSEMBLY - PARTS LIST (Figure 32)

Item #	Part #	Description	Qty
1	A13794-00	Manifold, Evolver 500 Series, Assembly	1
2	A11717-00	Rod, Support Dual Purge	5
3	LSOR0005-18	O-Ring, PTFE Encapsulated (2-222)	1
4	79001-14	O-Ring, Solvent Proof	6
5	78449-00	Fitting, Fluid	2
6	EMF-202-04	Ferrule, Back 1/4” Tube	2
7	EMF-203-04	Ferrule, Front 1/4” Tube	2
8	“D”	Cascade Assembly (HP 404 Type)	1
9	“A”	Solvent Line Tubing Coil	1
10	79001-07	O-Ring, Solvent Proof	10
11	A13430-00	Rear Plate Assembly (Single/Dual Purge)	1
12	“B”	Assembly, Valve Manifold, Dual Purge	1
13	7683-16C	Screw 1/4-20 Stainless Steel	8
14	77508-00	Airbolt, Machined	5
15	A13412	Break Away Ring (Single /Dual Purge)	1
17	A11984-00	Screw, Hex HD Cap, 1/4-20 X 1/8, Machined	1
18	“E”	Shroud, Evolver 500 Series	1
19	79001-06	O-Ring, Solvent Proof	2
20	79001-04	O-Ring, Solvent Proof	2
21	A13796-00	Fiber Optic Plug	1
23	A13842-00	Plug	1

TABLE F - MANIFOLD CONFIGURATION

Item #	Description	"A"	"B"	"D"	"E"
A13795-01	.25" O.D. x .125" I.D. FOR HIGHLY RESISTIVE MATERIALS (CLEAR COAT) SINGLE PURGE, ROUND SHROUD	77531-00	A13729-02	79010-00	A13863-00
A13795-02	.25" O.D. x .170" I.D. FOR CONDUCTIVE MATERIALS (BASE/CLEAR) SINGLE PURGE, ROUND SHROUD	77517-00	A13729-02	79010-00	A13863-00
A13795-03	.25" O.D. x .125" I.D. FOR HIGHLY CONDUCTIVE MATERIALS (BASE/CLEAR) SINGLE PURGE, ROUND SHROUD	78450-00	A13729-02	79010-00	A13863-00
A13795-04	.25" O.D. x .125" I.D. FOR HIGHLY RESISTIVE MATERIALS (CLEAR COAT) DUAL PURGE, ROUND SHROUD	77531-00	A13540-02	79010-00	A13863-00
A13795-05	.25" O.D. x .170" I.D. FOR CONDUCTIVE MATERIALS (BASE/CLEAR) DUAL PURGE, ROUND SHROUD	77517-00	A13540-02	79010-00	A13863-00
A13795-06	.25" O.D. x .125" I.D. FOR HIGHLY CONDUCTIVE MATERIALS (BASE/CLEAR) DUAL PURGE, ROUND SHROUD	78450-00	A13540-02	79010-00	A13863-00
A13795-13	.25" O.D. x .125" I.D. FOR HIGHLY RESISTIVE MATERIALS (CLEAR COAT) SINGLE PURGE, GROUNDING CASCADE, ROUND SHROUD	77531-00	A13729-02	A12429-00	A13863-00
A13795-14	.25" O.D. x .170" I.D. FOR CONDUCTIVE MATERIALS (BASE/CLEAR) SINGLE PURGE, GROUNDING CASCADE, ROUND SHROUD	77517-00	A13729-02	A12429-00	A13863-00
A13795-15	.25" O.D. x .125" I.D. FOR HIGHLY CONDUCTIVE MATERIALS (BASE/CLEAR) SINGLE PURGE, GROUNDING CASCADE, ROUND SHROUD	78450-00	A13729-02	A12429-00	A13863-00
A13795-16	.25" O.D. x .125" I.D. FOR HIGHLY RESISTIVE MATERIALS (CLEAR COAT) DUAL PURGE, GROUNDING CASCADE, ROUND SHROUD	77531-00	A13540-02	A12429-00	A13863-00
A13795-17	.25" O.D. x .170" I.D. FOR CONDUCTIVE MATERIALS (BASE/CLEAR COAT) DUAL PURGE, GROUNDING CASCADE, ROUND SHROUD	77517-00	A13540-02	A12429-00	A13863-00
A13795-18	.25" O.D. x .125" I.D. FOR HIGHLY CONDUCTIVE MATERIALS (BASE/CLEAR) DUAL PURGE, GROUNDING CASCADE, ROUND SHROUD	78450-00	A13540-02	A12429-00	A13863-00
A13795-19	.25" O.D. x .125" I.D. FOR HIGHLY RESISTIVE MATERIALS (CLEAR COAT) SINGLE PURGE, SPLIT SHROUD	77531-00	A13729-02	79010-00	A13559-01
A13795-20	.25" O.D. x .170" I.D. FOR CONDUCTIVE MATERIALS (BASE/CLEAR) SINGLE PURGE, SPLIT SHROUD	77517-00	A13729-02	79010-00	A13559-01
A13795-21	.25" O.D. x .125" I.D. FOR HIGHLY CONDUCTIVE MATERIALS (BASE/CLEAR) SINGLE PURGE, SPLIT SHROUD	78450-00	A13729-02	79010-00	A13559-01
A13795-22	.25" O.D. x .125" I.D. FOR HIGHLY RESISTIVE MATERIALS (CLEAR COAT) DUAL PURGE, SPLIT SHROUD	77531-00	A13540-02	79010-00	A13559-01
A13795-23	.25" O.D. x .170" I.D. FOR CONDUCTIVE MATERIALS (BASE/CLEAR) DUAL PURGE, SPLIT SHROUD	77517-00	A13540-02	79010-00	A13559-01
A13795-24	.25" O.D. x .125" I.D. FOR HIGHLY CONDUCTIVE MATERIALS (BASE/CLEAR) DUAL PURGE, SPLIT SHROUD	78450-00	A13540-02	79010-00	A13559-01
A13795-25	.25" O.D. x .125" I.D. FOR HIGHLY RESISTIVE MATERIALS (CLEAR COAT) SINGLE PURGE, GROUNDING CASCADE, SPLIT SHROUD	77531-00	A13729-02	A12429-00	A13559-01
A13795-26	.25" O.D. x .170" I.D. FOR CONDUCTIVE MATERIALS (BASE/CLEAR) SINGLE PURGE, GROUNDING CASCADE, SPLIT SHROUD	77517-00	A13729-02	A12429-00	A13559-01
A13795-27	.25" O.D. x .125" I.D. FOR HIGHLY CONDUCTIVE MATERIALS (BASE/CLEAR) SINGLE PURGE, GROUNDING CASCADE, SPLIT SHROUD	78450-00	A13729-02	A12429-00	A13559-01
A13795-28	.25" O.D. x .125" I.D. FOR HIGHLY RESISTIVE MATERIALS (CLEAR COAT) DUAL PURGE, GROUNDING CASCADE, SPLIT SHROUD	77531-00	A13540-02	A12429-00	A13559-01
A13795-30	.25" O.D. x .170" I.D. FOR CONDUCTIVE MATERIALS (BASE/CLEAR COAT) DUAL PURGE, GROUNDING CASCADE, SPLIT SHROUD	77517-00	A13540-02	A12429-00	A13559-01
A13795-31	.25" O.D. x .125" I.D. FOR HIGHLY CONDUCTIVE MATERIALS (BASE/CLEAR) DUAL PURGE, GROUNDING CASCADE, SPLIT SHROUD	78450-00	A13540-02	A12429-00	A13559-01

A13436 TUBING BUNDLE ASSEMBLY MODEL IDENTIFICATION



EVOLVER 500 SERIES ASSEMBLY - PARTS LIST

Item	Qty	Part #	Description	Where Used
1	1	A13394-00	ROBOT PLATE ASSEMBLY (RMA SINGLE/DUAL PURGE)	
2	1	“AE’	LOW VOLTAGE CABLE (QUICK DISCONNECT)	LV
3	1	“A”	FIBER OPTIC CABLE	FO
5	1	A13411-00	RETENTION PLATE	
6	“K”	A13410-00	BARB FITTING (8 X 5)	SOL, P1 IN, CW, P2/CW SOLV
7	“J”	A13407-00	FITTING (4MM X 2.7MM)	ST/RP, BA RTN, PT1, P1D, P2T/CWT, P2D/CWA
8	“H”	A13409-00	TUBE RECEIVER (4 X 2.7)	ST/RP, BA RTN, PT1, P1D, P2T/CWT, P2D/CWA
9	“G”	77536-05	TUBING, 4MM O.D.(NATURAL)	PT2/CWT
10	“T”	77536-03	TUBING, 4MM O.D.(GREEN)	PT1
11	“U”	77536-07	TUBING, 4MM O.D.(YELLOW)	BA RTN
12	“V”	77536-06	TUBING, 4MM O.D.(GREY)	P1D
13	“W”	77536-04	TUBING, 4MM O.D.(BLUE)	ST/RP
14	1	“B”	ROBOT ADAPTER	
15	“L”	A13405-00	RECEIVER (8 X 5)	CW, P1 IN, SOL, P2/CW, SOLV
16	“M”	A13406-00	RECEIVER (10MM)	TA, DL1, DL2/AIR
17	“X”	A10839-06	TUBE, 10 MM OD X 8 MM ID (GREEN)	TA
18	“Y”	76698-02	TUBING, PFA	CW, P1 IN, SOL, P2/CW, SOLV
19	2	A13437-00	SET SCREW (M4 NYLON POINT)	
20	“O”	77536-01	TUBING (4MM BLACK)	P2D/CWA
21	“AC”	A13399-00	RECEIVER (8X6)	BA/PT, SAO/FA, BRK, SAI/AA
22	“AD”	A13400-00	BARB FITTING (8X6)	BA/PT, SAO/FA, BRK, SAI/AA
23	“Z”	A10893-07	TUBING (8 X 6) BLUE	SAI/AA
24	“AA”	A10893-04	TUBING (8 X 6) GRAY	SAO/FA
25	“AB”	A10893-10	TUBING (8 X 6) NATURAL	BRK, BA/PT
26	“D”	79001-04	O-RING, SOLVENT PROOF	
27	“F”	79001-05	O-RING, SOLVENT PROOF	TA, DL1, DL2/AIR
28	4	A13438-00	SCREW, FLAT HEAD SLOTTED, M4 X 16MM, SS	RETENTION PLATE
29	6	76566-24C	SCREW, STAINLESS 1/4-20 X 3/4 LG. S.H.C.S.	ROBOT ADAPTER
30	“P”	A13538-00	BARB FITTING (10 X 7)	DL1, DL2/AIR
31	“Q”	A12211-00	TUBING (10MM X 7MM NYLON)	DL1, DL2/AIR
32	1	“C”	LOW VOLTAGE CABLE EXTENSION	
33	1	A13408-00	BARB FITTING (10 X 8)	TA
36	1	A13392-00	UNION, F.O. - (SUPPORT ITEM SHIP WITH MANIFOLD)	

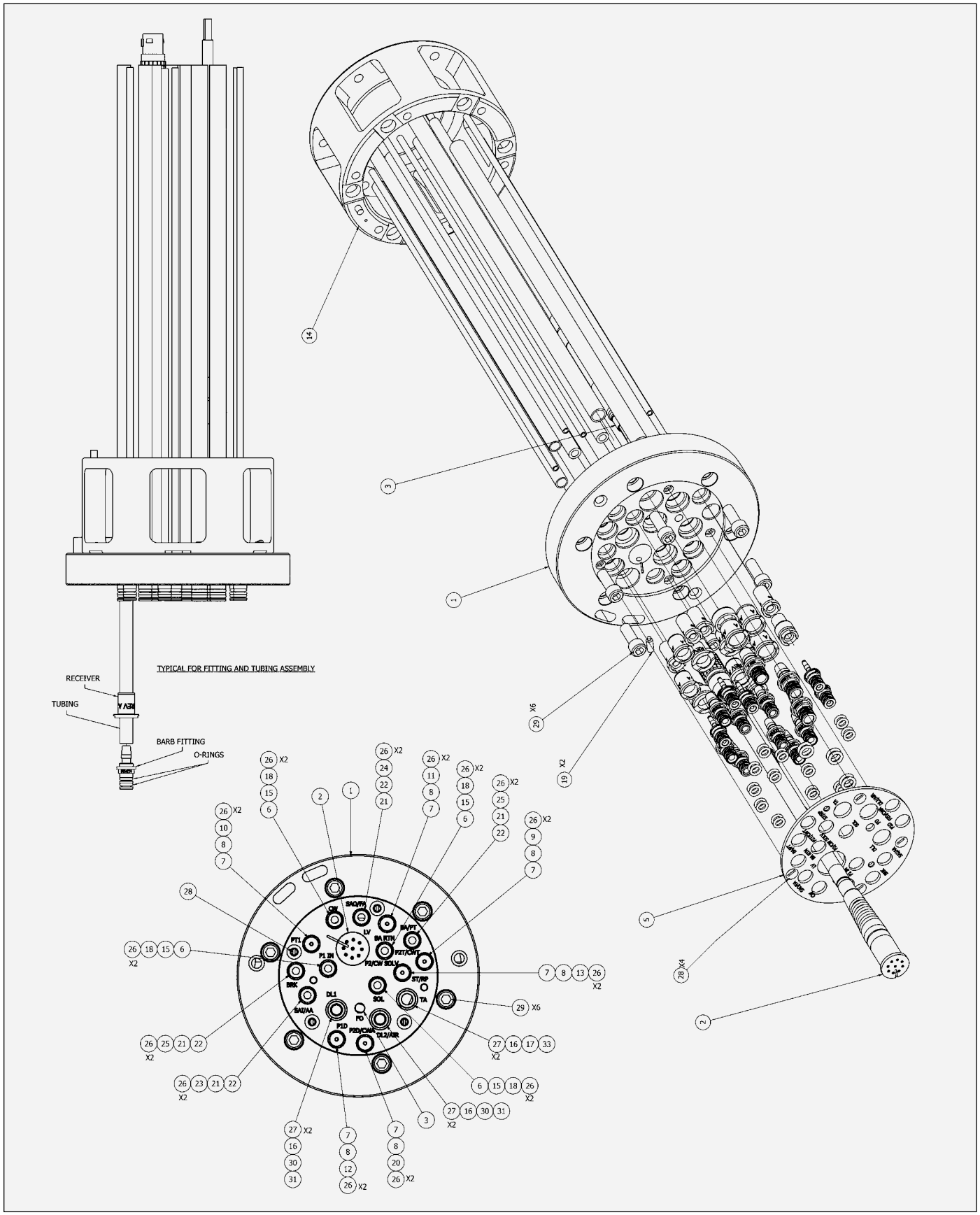


Figure 33: A13436-XXXXXXXXXXXX Tubing Bundle Assembly

TABLE A - (TUBING SELECTION)

Dash #	Description	"G" Qty	"O" Qty	"Q" Qty	"T" Qty	"U" Qty	"V" Qty	"W" Qty	"X" Qty	"Y" Qty	"Z" Qty	"AA" Qty	"AB" Qty
00	NO TUBING	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
01	SINGLE/DUAL PURGE	42 ft.	42 ft.	42 ft.x2	42 ft.	42 ft.	42 ft.	42 ft.	6 ft.	42 ft.x4	42 ft.	42 ft.	42 ft.x2

TABLE B - (SINGLE/DUAL PURGE FITTING/RECEIVER SELECTION)

Dash #	Description	"D" Qty	"F" Qty	"H" Qty	"J" Qty	"K" Qty	"L" Qty	"M" Qty	"P" Qty	"AC"	"AD"
01	Single/Dual Purge	28	6	6	6	4	4	3	2	4	4

TABLE C - FIBER OPTIC CABLE - PRIMARY

Dash Number	Description	"A"
00	FIBER OPTIC CABLE (NOT INCLUDED)	N/A
01	3 FT.	A14189-01
02	6 FT.	A14189-02
03	10 FT.	A14189-03
04	15 FT.	A14189-04
05	25 FT.	A14189-05

NOTE

➤ Turbine air (TA) to be supplied at a maximum length of 6 Ft. User or Integrator must increase to 12mm OD tube after 6 Ft.

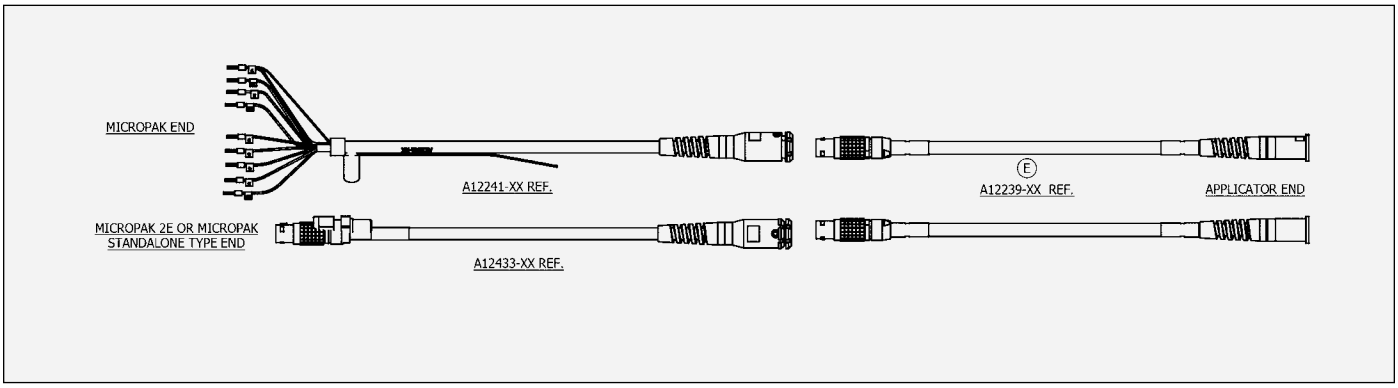


Figure 34: Low Voltage Cables

TABLE D - (LOW VOLTAGE CABLE EXTENSION)

Dash #	"C"	Description	Length
00	-----	N/A	N/A
01	A12241-15	QUICK CONNECT TO MICROPAK - OPEN LEADS	15 FT.
02	A12241-25	QUICK CONNECT TO MICROPAK - OPEN LEADS	25 FT.
03	A12241-40	QUICK CONNECT TO MICROPAK - OPEN LEADS	40 FT.
04	A12241-50	QUICK CONNECT TO MICROPAK - OPEN LEADS	50 FT.
05	A12241-75	QUICK CONNECT TO MICROPAK - OPEN LEADS	75 FT.
06	A12433-25	QUICK CONNECT TO MICROPAK - QUICK CONNECT ENDS	25 FT.
07	A12433-50	QUICK CONNECT TO MICROPAK - QUICK CONNECT ENDS	50 FT.
08	A12433-75	QUICK CONNECT TO MICROPAK - QUICK CONNECT ENDS	75 FT.

TABLE E - ROBOT ADAPTER

Dash #	Description	"B"	Notes
00	ADAPTER NOT INCLUDED	N/A	
01	FANUC P145/P155	78983-00	STANDARD LENGTH WITH WINDOWS
02	ABB 5400, 5002	79107-00	STANDARD LENGTH WITH WINDOWS
03	FANUC P200/P250	79131-00	STANDARD LENGTH WITH WINDOWS
04	KAWASAKI KE610L	A10847-00	STANDARD LENGTH WITH WINDOWS
05	MOTOMAN PX2850	A10848-00	STANDARD LENGTH WITH WINDOWS
06	MOTOMAN PX2900	A10849-00	STANDARD LENGTH WITH WINDOWS
07	B&M LZ2000	A10851-00	STANDARD LENGTH WITH WINDOWS
08	ABB 5400 ENHANCED WRIST	A12036-00	STANDARD LENGTH WITH WINDOWS
09	MOTOMAN EPX2050	A13697-00	STANDARD LENGTH WITH WINDOWS
10	FANUC P200-P250	A13733-00	EXTENDED LENGTH WITH 1 WINDOW
11	KAWASAKI KE610L	A13734-00	EXTENDED LENGTH WITH 1 WINDOW
12	ABB 5400 ENHANCED WRIST	A13735-00	EXTENDED LENGTH WITH 1 WINDOW
13	MOTOMAN EXP2050	A13736-00	EXTENDED LENGTH WITH 1 WINDOW

TABLE F - LOW VOLTAGE CABLE LENGTH

Dash #	Description	"AE"
0	NO LOW VOLTAGE CABLE	N/A
1	6 FT. LONG LOW VOLTAGE CABLE	A12239-06
2	10 FT. LONG LOW VOLTAGE CABLE	A12239-10
3	25 FT. LONG LOW VOLTAGE CABLE	A12239-25
4	50 FT. LONG LOW VOLTAGE CABLE	A12239-50
5	75 FT. LONG LOW VOLTAGE CABLE	A12239-75
6	GROUND CONTACT ASSEMBLY	A12826-00

TABLE G - FIBER OPTIC CABLE - SECONDARY

Dash #	Description	"A"
00	NO F.O. CABLE	N/A
15	25 FT.	A14195-15
16	40 FT.	A14195-16
17	50 FT.	A14195-17
18	65 FT.	A14195-18
19	75 FT.	A14195-19
20	100 FT.	A14195-20
21	120 FT.	A14195-21

TUBING BUNDLE NOMENCLATURE

SAO/FA	Outer Shaping Air (Outer Air)
SAI/AA	Inner Shaping Air (Inner Air)
BA/PT	Bearing Air Supply
BA, RTN	Bearing Air Return
P1D	Dump Trigger #1
DL2/AIR	Dump Out #2 / Cup Wash Air
PT1	Paint Trigger #1
P1 IN.	Paint Supply #1
ST/RP	Solvent Trigger
SOL	Solvent Supply
TA	Turbine Air Supply
LV	Low Voltage Cable Port
FO	Fiber Optic Cable Port
CW	Cup Wash
P2/CW SOLV	Paint Supply #2
BRK	Brake Air
P2T/CWT	Paint Trigger #2 / Cup Wash Solvent Trigger
P2D/CWA	Dump Trigger #2 / Cup Wash Air Trigger
DL1	Dump Out #1

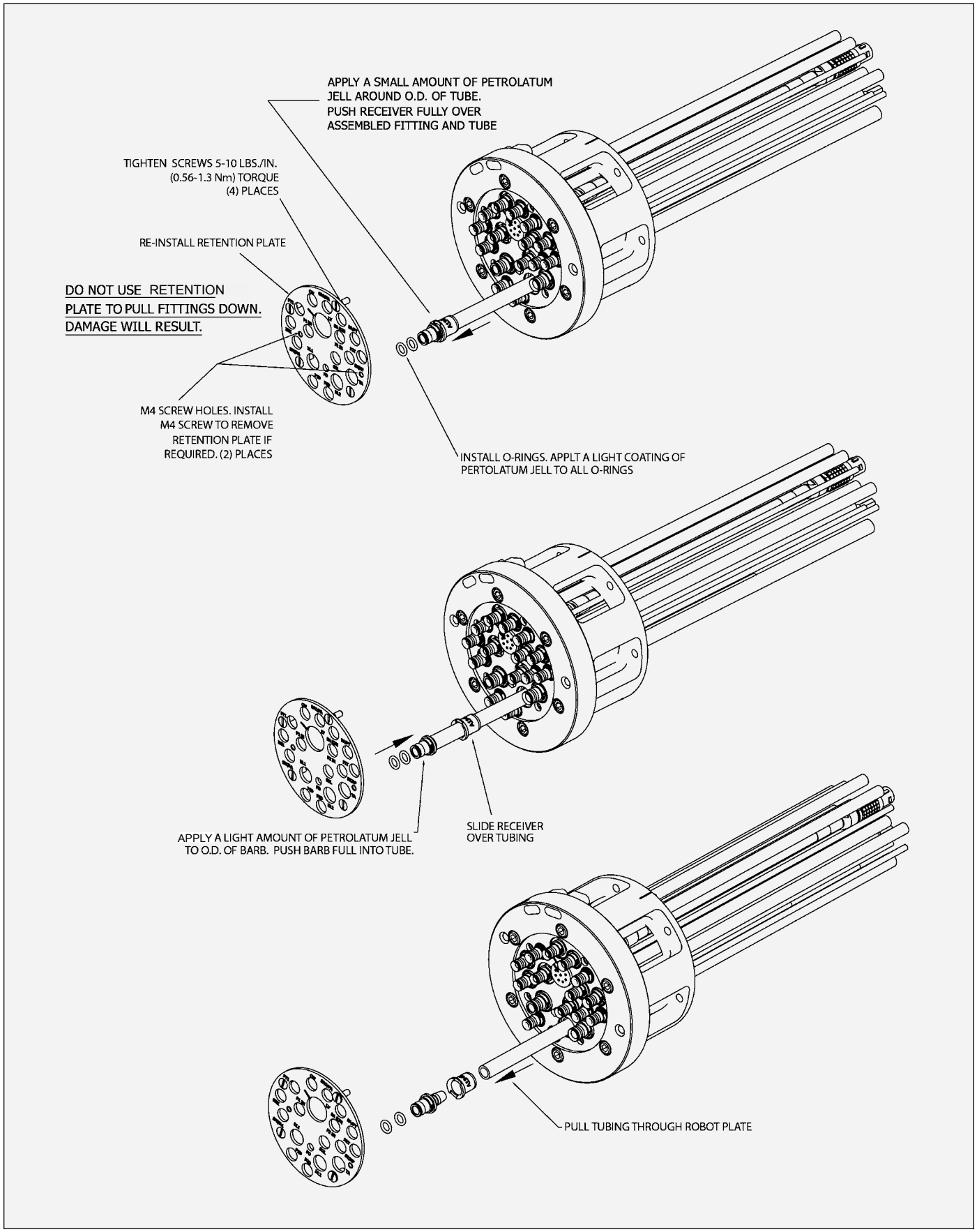


Figure 35: Tubing Bundle

A13613 MICROPAK 2e CONTROL UNIT

(See the current "MicroPak 2e" Service Manual supplied with the control unit for service information.)

ACCESSORIES

Accessories for the Evolver 500 Series Solventborne spray applicators include:

ACCESSORIES AND SERVICE KITS	
Part #	**Description**
LSCH0009-00	Dielectric Grease (.88 oz. Tube)
76652-01	Kit for measuring high voltage. (Includes Multi-Function Meter (76634-00) and High Voltage Probe Assembly (76667-00).
76652-02	Kit for measuring short circuit current (SCI), resistance, and sprayability. Includes Multi-Function Meter (76634-00) and Test Lead Assembly. (76664-00).
76652-03	Kit for measuring paint resistivity. (Includes Multi-Function Meter (76634-00) and Paint Probe Assembly (7922-00).
76652-04	Deluxe Kit (Performs all functions listed above.) Includes Multi-Function Meter (76634-00), Paint Probe Assembly (7922-00). Test Lead Assembly (76664-00), and High Voltage Probe Assembly (76667-00).
RPM-32	Pre-Filter Replacement Element
RPM-33	Bearing Air Filter Element
75777-XX	Spray Applicator Covers
74035-XX	Test Air Cap and Gauge Assembly
73896-01	Electrode and Air Cap Protector
79203-00	Tool Kit
77620-00	Valve Plug Kit
80202	Kit for Trans-Tech. Includes (Ev-40 Air Cap 80194), (Nozzle, Fluid, Marked with TT on one flat 80198), (Ring, Retaining 80199), (Tip, Fluid “A” choose between 80201-44 or 80201-48).

80202 TRANS-TECH KIT

Part No.	Description	Qty.
80194	EV-40 AIR CAP	1
80198	NOZZLE, FLUID, MARKED WITH TT ON ONE FLAT	1
80199	RING, RETAINING	1
“A”	TIP, FLUID	1

80202 TRANS-TECH FLUID TIPS

Assembly No.	Description	“A”
80202-44	1.4MM (.055”) DIA. TIP	80201-44
80202-48	1.2MM (.047”) DIA. TIP	80201-48

75777-XX SPRAY APPLICATOR COVERS

Part #	Description
75777-01	Single Head Spray Applicator
75777-02	Dual Head Spray Applicator
75777-03	Robot Wrist Flange

74035-XX TEST AIR CAPS AND GAUGE ASSEMBLY

Part #	Description
74035-21	#65R-1 Test Cap
74035-22	#98-1 Test Cap
74035-23	#63-1 Test Cap
74035-30	#EV-40 Test Cap

The 74035, Test Air Cap and Gauge Assembly, is designed for use with a Test Station or while the applicator is connected to the robot or reciprocator. The test air cap is comprised of two air pressure gauges, pressure gauge stand, special 74061-XX air caps, and all required tubing and fittings.

The air cap has two tapped holes for small barbed tube fittings. The fittings are located so that the gauges connected to them will measure the actual cap pressure of the atomization and pattern air.

Using this test cap will assure uniform atomization and pattern quality, regardless of air supply tube lengths from one applicator to another.

73896-01 Electrode and Air Cap Protector

This is a plastic cylinder that fits over the air cap retainer. The protector keeps the electrode and other spray head parts from being damaged during booth cleaning and at other times when the spray applicator is not in use.

79203-00 Tool Kit

Provided with each applicator is a tool kit to aid in the disassembly and assembly of the applicator during servicing.

79203-00 TOOL KIT

Part #	Description
A11922-00	Valve Removal Tool
A10766-00	Valve Seat Removal Tool
76772-00	Retaining Ring Spanner
A10400-00	Seal Carrier Tool

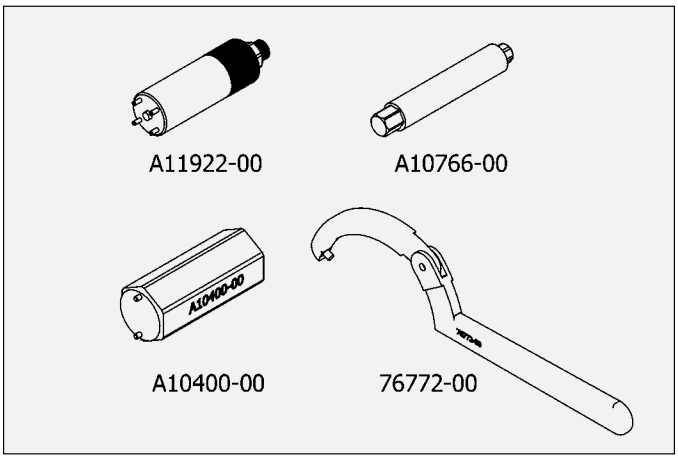


Figure 36: 79203-00 Tool Kit

The A11284-00 support and rod removal tool is also available.

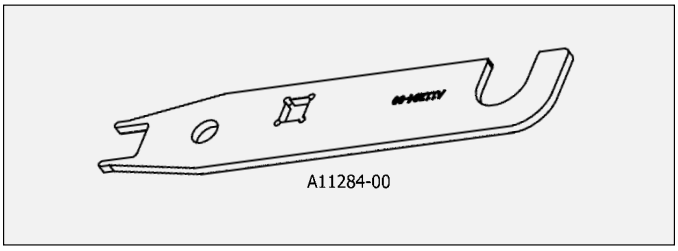


Figure 37: A11284-00 Support and Rod Tool

A10410-00 Spray Head O-Ring Kit

Available for purchase as a kit containing all of the o-rings used for a single Evolver 500 Series dual purge spray head. This kit can be purchased to replace o-rings.

A10410-00 SPRAY HEAD O-RING KIT		
Part #	**Description**	**Qty**
79001-04	O-Ring, Solvent Proof	1
79001-06	O-Ring, Solvent Proof	1
79001-05	O-Ring, Solvent Proof	1

A10411-00 Spray Head Repair Kit

Available for purchase as a kit for the common spray head parts that require replacement. This kit contains parts for one applicator head.

A10411 SPRAY HEAD REPAIR KIT		
Part #	**Description**	**Qty**
79151-00	Needle Shaft	1
7723-06	Piston, U-Cup	1
79001-28	O-Ring, Solvent Proof	1
79001-29	O-Ring, Solvent Proof	1
13076-13	O-Ring	1
RME-38	Spring	1
RME-32	Seal	1
79001-01	O-Ring, Solvent Proof	4
79001-04	O-Ring, Solvent Proof	1
79001-06	O-Ring, Solvent Proof	3
79001-05	O-Ring, Solvent Proof	1

77620-00 Valve Plug Kit

Available for purchase is a Valve Plug Kit than can be used in place of valves and seats to convert the applicator to a single purge applicator.

77620-00 VALVE PLUG KIT (Optional - Use In Place Of Valve & Seat)		
Part #	**Description**	**Qty**
79244-00	Plug	1
77618-00	Plug Seat	1
79001-19	O-Ring, Solvent Proof	1
79001-14	O-Ring, Solvent Proof	1

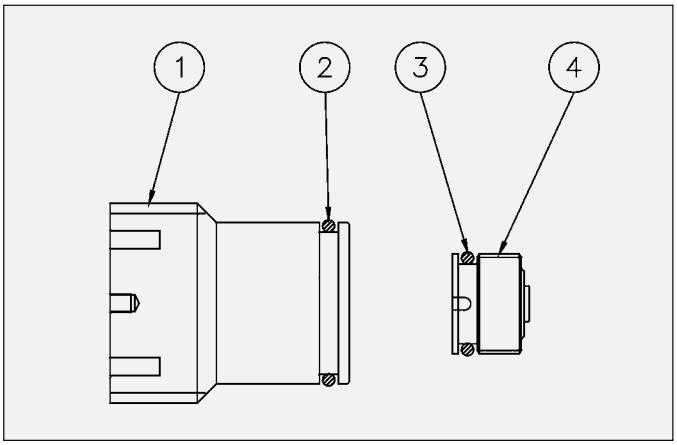


Figure 38: 77620-00 Valve Plug Assembly

Fluid Coils
(Separate Sales Parts Only)

If purchasing spare parts, they must be modified as explained.

To ensure proper sealing and holding, the fittings require that the ends of the fluid coils have a groove cut into them as shown (see Figure 39). Use groove cutter A11567-00 by sliding the end of the tool over the tubing until it bottoms out. Hold the tubing in one hand and the tool in the other. Make three complete revolutions of the tool, on the tubing, in the direction of the arrow stamped on the tool. To remove the tool, hold the tube and the main body of the tool with one hand, slide the rear portion of the tool back until it stops. Pull out the tubing from the end of the tool. By pulling back the rear portion of the tool, it relieves the pressure of the cutting edge off of the tubing before sliding it out. Trim off ends to dimensions shown. End should be cut off square. Slide the fitting and ferrules onto the tube as shown. The tapered ferrule must go past the newly cut groove to properly lock into place when installed.

Tighten nuts into manifolds by hand until it stops. Using a 9/16" (14.3mm) end-wrench, tighten 1/4-1/2 turn.

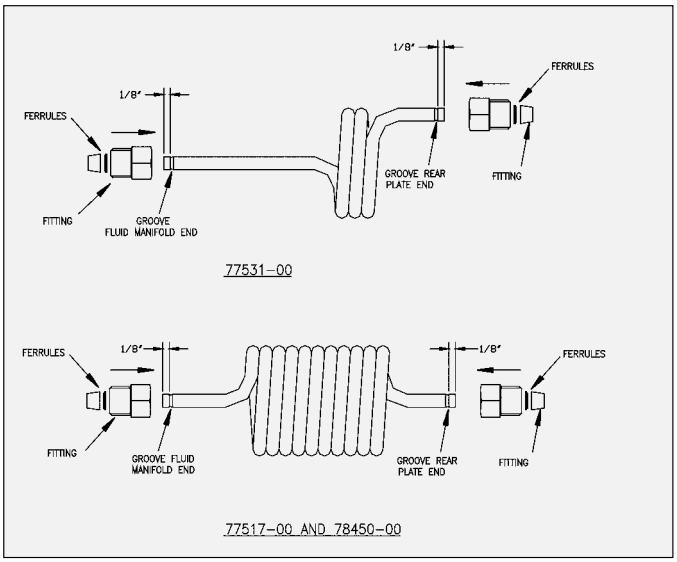


Figure 39: Fluid Coils

REPAIR KITS

Part #	Description	Number of Applicators				Notes
		1-2	3-4	5-6	7-8	
A10410	Spray Head Mounting Seal O-Ring Kit	1	2	3	4	**Includes:** 1 ea. - 79001-04 O-Ring (Solvent Proof) 2 ea. - 79001-06 O-Ring (Solvent Proof) 1 ea. - 79001-05 O-Ring (Solvent Proof)
A10411	Spray Head Repair Kit	1	2	3	4	**Includes:** 1 ea. - 79151-00 Needle Shaft 1 ea. - 7723-06 Piston, U-Cup 1 ea. - 79001-28 O-Ring (Solvent Proof) 1 ea. - 79001-29 O-Ring (Solvent Proof) 3 ea. - 79001-01 O-Ring (Solvent Proof) 1 ea. - 13076-13 O-Ring 1 ea. - 79001-06 O-Ring (Solvent Proof) 1 ea. - RME-38 Spring 1 ea. - RME-32 Seal 1 ea. - 79001-01 O-Ring (Solvent Proof) 1 ea. - 79001-04 O-Ring (Solvent Proof) 2 ea. - 79001-06 O-Ring (Solvent Proof) 1 ea. - 79001-05 O-Ring (Solvent Proof) 2 ea. - 14061-09 Conductive Foam 1 ea. - 79171-00 Contact Spring

SERVICE PARTS

Part #	Description	Number of Applicators				Notes
		1-2	3-4	5-6	7-8	
80432-XX	Complete Head Assembly	1	2	2	3	
79153-65R-1	Air Cap	1	2	3	4	79196-98-1, 79197-63-1(Optional Air Caps)
79140-02	Fluid Tip	1	2	3	4	01=.042",03=.070" (Optional Fluid Tips)
70430-01	Electrode	1	2	3	4	
79142-00	Screw	2	2	4	4	
79171-00	Spring, Connector	2	2	4	4	
79141-00	Plug, Connection	2	2	4	4	
14061-09	Conductive Foam	1	1	2	2	
79144-00	Shaft, Air Valve	1	1	2	2	
79143-00	Bushing, Air Valve	1	1	2	2	
79173-00	Block, Locking	2	2	4	4	
79174-00	Screw	1	1	2	2	
77367-00	Seat Assembly	1	1	2	2	
80194-00	Air Cap	1	2	3	4	Use with 80201-44, 80201-48 (Trans-Tech)
80201-44	Fluid Tip	1	2	3	4	48= .047" (Optional Fluid Tip) (Trans-Tech)

LUBRICANTS AND SEALERS

Part #	Description
A11545-00	Petroleum Jelly Lubricant for all O-Rings
7969-03	Thread Sealant (Blue), Adhesive 24077
7969-10	Thread Sealant (White), Adhesive 59231, Paste
7969-05	Thread Sealant (Purple), Adhesive 22221
LSCH0009-00	Dielectric Grease .83oz.

TUBE BUNDLE RECOMMENDED SPARE PARTS

Part No.	Description	Qty
Select Option Below- A13436 Tubing Bundle Assembly		
A12239-06	Low Voltage Cable (6 Ft. (1.8 Meters)Quick Disconnect)	1
A13411-00	Retention Plate	1
A13438-00	Screw (For Retention Plate)	3-5
A13437-00	Set Screw (For Low Voltage Cable and Fiber Optic)	1-2
79001-04	O-ring, Solvent Proof	10-15
79001-05	O-ring, Solvent Proof	2-4
A13410-00	Barb Fitting (8x5)	1-2
A13405-00	Receiver (8x5)	1-2
A13400-00	Barb Fitting (8x6)	1-2
A13399-00	Receiver (8x6)	1-2
A13408-00	Barb Fitting (10x8)	1-2
A13406-00	Receiver (10x8) (10x7)	1-2
A13538-00	Barb Fitting (10x7)	1-2
A13407-00	Barb Fitting (4mm)	1-2
A13409-00	Receiver (4mm)	1-2
Select Option Below- Low Voltage Cable Extension		
A12433-25	Quick Connect to MicroPak 2e - Quick Connect Ends 25 Ft. (7.6 Meters)	1
A12433-50	Quick Connect to MicroPak 2e - Quick Connect Ends 50 Ft. (15.2 Meters)	1
A12433-75	Quick Connect to MicroPak 2e - Quick Connect Ends 75 Ft. (22.9 Meters)	1
Select Option Below- Tubing		
77536-01	Tubing 4mm Nylon (Black)	---
77536-03	Tubing 4mm Nylon (Green)	---
77536-04	Tubing 4mm Nylon (Blue)	---
77536-05	Tubing 4mm Nylon (Natural)	---
77536-06	Tubing 4mm Nylon (Grey)	---
77536-07	Tubing 4mm Nylon (Yellow)	---
76698-02	Tubing, PFA	---
A10893-04	Tubing 8 x 6 Nylon (Gray)	---
A10893-07	Tubing 8 x 6 Nylon (Blue)	---
A10893-10	Tubing 8 x 6 Nylon (Natural)	---
A12221-00	Tubing 10 x 7 Nylon (Natural)	---

EVOLVER 500 SERIES DUAL PURGE RECOMMENDED SPARE PARTS (Per Applicator)		
Part No.	**Description**	**Qty**
Tubing Bundle		
A12209-00	Fitting, 7mm X 10mm X 1/4" BSPT	1-2
A12210-00	Tube Fitting, 5mm X 8mm X 1/4" BSPT	1-2
A12213-00	Fitting, Modified, 6mm X 1/8" BSPT, Push Connect	1-2
77544-01	Male Connector, 4mm ODT X 10-32 Thd.	5-8
A11063-00	Insert	4-6
A10891-03	Fitting, 1/4" BSP X 8mm ODT, Straight	1-2
SSF-2052	Set Screw, 3/8" Lg. X 10-24	1
76566-24C	Screw, Stainless, 1/4-20 X 3/4" Lg., SHCS	3-4
A12212-00	Fitting, 6mm X 4mm X 1/8" BSPT	1-2
A12239-00	Low Voltage Cable, Quick Disconnect	1
Table H - "J"	Low Voltage Cable Assembly	1
76698-02	Tubing, PFA, 5/16" OD X 3/16" ID	--
77536-07	Tube, 4mm OD X 2.7mm ID, Yellow	--
77535-01	Tube, 4mm OD X 2.7mm ID, Black	--
77536-03	Tube, 4mm OD X 2.7mm ID, Green	--
77536-04	Tube, 4mm OD X 2.7mm ID, Blue	--
77535-05	Tube, 4mm OD X 2.7mm ID, Natural	--
A10893-07	Tube, 8mm OD X 6mm ID, Blue	--
A10840-08	Tube, 6mm OD X 4mm ID, Yellow	--
A10840-09	Tube, 6mm OD X 4mm ID, Orange	--
A10841-03	Tubing, PFA, 6mm OD X 4mm ID	--
A10893-04	Tube, 8mm OD X 6mm ID, Gray	--
77536-06	Tube, 4mm OD X 2.7mm ID, Silver	--
A12211-00	Tubing, Nylon, 10mm OD X 7mm ID, Natural	--
Evolver 500 Series Dual Purge Manifold		
77367-00	Valve Seat Assembly	2
78949-00	Fluid Valve Assembly	2
LSCH0009-00	Dielectric Grease	1
79141-00	Connection Plug	1
79206-00	Screw, Fillister Head, 10-32 X 2 1/4" Long	0-4
LSFA0027-00	Screw, Fillister Head, 10-32, Fiberglass	0-4
A10612-00	Ring, Square Cut	2-4
79142-00	Screw, 8-32 X .75" Lg., SHCS, Fiberglass	3

(Continued On Next Page)

EVOLVER 500 SERIES DUAL PURGE RECOMMENDED SPARE PARTS (Per Applicator) (Cont.)

Part No.	Description	Qty
Evolver 500 Series Dual Purge Manifold (Cont.)		
A12374-XX	Complete Evolver 500 Series Dual Purge	1
A11717-00	Rod, Support (RMA Dual Purge)	2-3
79001-14	O-Ring, Solvent Proof	6
79001-07	O-Ring, Solvent Proof	10
78449-00	Fitting,Fluid	2
EMF-202-04	Ferrule, Back, 1/4"	2
EMF-203-04	Ferrule, Front, 1/4"	2
7683-16C	Screw, 1/4-20, Stainless Steel	2-3
77508-00	Bolt, Air	2-3
77524-00	Screw, Break-Away	4
A11984-00	Screw, Hex Head Cap, 1/4-20 X 1/8”, Machined	1
79010-00	Cascade Assembly (HP-404 Type)	1
79001-06	O-Ring, Solvent Proof	2
79001-04	O-Ring, Solvent Proof	1
77517-00	Coiled Tube, 1/4” OD X .170” ID, PFA, Conductive Materials	0-1
78450-00	Coiled Tube, 1/4” OD X .125” ID, PFA, Highly Conductive Materials	0-1
77531-00	Coiled Tube, 1/4” OD X .125” ID, PFA, Highly Resistive Materials	0-1
76566-24C	Screw, 1/4-20 X 3/4” SHCS	4-6
Evolver 500 Series Dual Purge Applicator Head		
9334-00	Spring, Valve Return	2
70430-01	Electrode, High Flex	4
79148-00	End Cap, Spray Head	3
EMF-7	Seal Washer	4
RME-32	Seal	4
79151-00	Assembly, Needle Shaft	1
79001-01	O-Ring, Solvent Proof	8
79001-04	O-Ring, Solvent Proof	2
79001-05	O-Ring, Solvent Proof	2
79001-06	O-Ring, Solvent Proof	8
79001-07	O-Ring, Solvent Proof	4
79001-08	O-Ring, Solvent Proof	4
79001-09	O-Ring, Solvent Proof	6
79001-14	O-Ring, Solvent Proof	2
79001-16	O-Ring, Solvent Proof	6
79001-28	O-Ring, Solvent Proof	2
79001-29	O-Ring, Solvent Proof	2
79001-31	O-Ring, Solvent Proof	2
79153-65R-1	Air Cap, Pinned	0-3

(Continued On Next Page)

EVOLVER 500 SERIES DUAL PURGE RECOMMENDED SPARE PARTS (Per Applicator) (Cont.)		
Part No.	**Description**	**Qty**
Evolver 500 Series Dual Purge Applicator Head (Cont.)		
79185-48-1	Air Cap, Pinned	0-3
EMF-195	Nozzle, Fluid Hole (8)	0-3
79140-02	Fluid Tip, 0.055” Diameter	0-3
79154-00	Retaining Ring, Tapered	2
80194-00	Air Cap	0-3
80198-00	Nozzle, Fluid	0-3
80201-44	Fluid Tip, .055” Diameter	0-3
80199-00	Retaining Ring	2
79137-00	Head, Machined, Robot Applicator	1
75777-XX	Applicator Covers	Accessory
13076-13	O-Ring, .566” OD X .426” ID	2
79146-00	Seat, Rear Piston	1
7723-06	Piston, U-Cup	1
80432-XX	Complete Spray Head	1

MANUAL CHANGE SUMMARY

AA-14-02-R6 - Replaces AA-14-02-R5 with the folowing changes:

No.	Change Description	Page(s)
1.	Change CHT to CFT on the first two images	Cover
2.	Change CHT to CFT on the bottom two images	18
3.	Change CHT to CFT on the gun	23
4.	Remove the figure numbers under procedures	33
5.	Change figure numbers on the last NOTE and the last sentence also remove NOTES after 4 and firstafter 8	34
6.	Change CHT to CFT in the image	35
7.	Change image text, new gun image and change to figure 12	35
8.	Correct logo on the gun and change figure 16 to 13 in caption and table	36
9.	Change description in item 21 and update to figure 16	37
10.	Page 38 moves to 39	39
11.	Page 39 moves to 40. Change figure number in subhead and in bullet point 15. Remove figure numbers in 7 and 11	40
12.	Page 40 moves to 41. Add text to subhead and update all figure numbers	41
13.	Page 41 moves to 38. Change logo on gun image and update figure numbers to 14 and 15	38
14.	Page 42 moves to 44. Update text in first paragraph and figure numbers in second subhead	44
15.	Page 43 moves to 42. Change logo on gun image and update figure number to 16	42
16.	Page 44 moves to 43. Update figure number to 16 in the first table	43
17.	Update figure numbers to 17 and 18	45
18.	Correct logo on the gun	57
19.	Change description in item 21	58
20.	Correct logo on the gun	59

WARRANTY POLICY

This product is covered by Carlisle Fluid Technologies materials and workmanship limited warranty. The use of any parts or accessories, from a source other than Carlisle Fluid Technologies, will void all warranties. For specific warranty information please contact Carlisle Fluid Technologies.

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